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On the Epizootiology of Bovine Mastitis of Streptococcic Origin.*

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Although it is not by any means easy to estimate the loss from disease of the cow's udder, the actual yearly sum is undoubtedly great and it would be difficult to over-emphasise its importance to the dairy farmer and the industry generally. The most obvious factor, complete loss of milk after acute mastitis, is in itself large, but to this must be added the far greater loss incurred in keeping animals affected with the relatively more common chronic mastitis. The recurrent disturbance which attends this form becomes increasingly frequent and severe, as age and lactation progress, and it is not uncommon for a cow, of otherwise useful character from her breeding and milk record, to become useless by the time she is six or seven years old.

Although mastitis is always important, it becomes much more so when efforts are being made to improve breeds and methods generally; often at considerable cost in personnel, and in purchasing pedigree sires, which should lead to an increase in the milk yield. A disease like mastitis which will lower, and often entirely prevent, the maximum yield, then becomes of great importance.

Some idea of the loss may be obtained by considering the figures of one or two workers. Proescholdt, who examined 1,126 herds in North Germany, found that only 4½ per cent. were free of streptococcal mastitis; and these herds were small, often containing a few cows only. The remaining 56 per cent., which were infected, were usually larger herds. The proportion of affected cows varied; it was occasionally as high as 80 out of every 100 cows and averaged just under 16. Klimmer, writing of Germany, estimated the annual loss at the equivalent of 10 million pounds sterling, and, as there are about 10 million dairy cows in Germany, that means £1 per cow per annum. This is admittedly only an estimate, but there is no doubt that in all dairying countries mastitis causes yearly an enormous loss due to lowered milk yield and to the feeding of animals that are unthrifty.

In a consideration of the way in which to deal with the problem, the first step must be to discuss the facts that we have regarding its epizootiology. What do we understand by the term "Mastitis"? Obviously under this term will always be included those cases which are called by the layman "Garget," "Weed," "Spider," or some other local term—that is, clinical cases of acute inflammation, or of chronically and markedly altered secretion. Under the term subacute will be included by the trained observer the less severe forms not included by the average milker under the terms enumerated but casually referred to by terms such as "a bit hard" or "milk apt to be thick and curdled." The terms, acute, subacute and chronic are useful from a descriptive point of view, but it is doubtful if they are of much value in discussing the epizootiology of mastitis because, although certain streptococci or other organisms do generally cause a typically acute or chronic type of disease, the most common causes of mastitis are streptococci, which may produce a chain of symptoms that would be classified at one time as subacute, at another as acute and after a lapse of some months as chronic.

These manifestations do not show the whole picture because we must recognise a stage much earlier than any so far mentioned, *the latent stage*. This does not invariably occur and with some causal agents is very short, but in the type of mastitis which I think forms the largest part of cases in this and probably other countries, it is a constant and often very extended stage. At this period even the fore milk may not be macroscopically altered nor the gland show any disturbance to a veterinarian experienced in the clinical examination of udders, but definite evidence of a more or less latent infection can be obtained by laboratory methods.

Cultural examination will show the presence of streptococci, and methods which reflect the reaction of the tissues, such as the number of cells and actual pH of the milk, may also indicate disturbance.

Method of Infection.

In any study of the epidemiology of a disease, the method of infection must be considered. Unfortunately, the method by which the udder becomes infected is not by any means certain, and, although most of the ordinary experimental methods have been tried, it has not been found easy to set up a condition which closely simulates the natural disease. The consensus of opinion amongst those who have worked on mastitis seems to favour the teat canal as the channel of infection and, in fact, this is the only method by which an infection with mastitis streptococci has been artificially produced. Infection with another variety of streptococcus has, however, been set up by means of teat scarification. Other views are that natural infection is hæmatogeneous, following ingestion of infected material, or that it occurs by way of sores and cracks on the udder or teat surface. A small number of experiments have been carried out by various workers on the possibility of oral or wound infection.

Cows have been fed with large quantities of streptococcus cultures in milk, or with milk from mastitis cows. Straw has been infected and fed. In both cases the results have been negative. The intravenous, intraperitoneal and subcutaneous channels have been tried, but without producing any disease of the udder. Cultures have been injected under the skin of the udder with negative results. Scarified areas of the skin of the udder and foot-and-

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mouth sores have been rubbed with mastitis streptococci but without result. One German worker, who had tried all of these methods on a series of cows and had in no case succeeded in producing even a transient mastitis, proceeded to attempt infection of various quarters of the same cow with up to 1 c.c. of milk from a mastitis case or with a small amount of culture. He reported that mastitis could be produced in three out of every four quarters tested. Further, if carbon particles were included in the injection, or if the lining of the teat duct was rubbed on the teat syphon used for injection, the percentage of positive results was nearly 100. An examination of his results shows, however, that the mastitis caused was of a transient kind, clearing up in a few days; and as work of my own has shown that, quite apart from bacteria, it requires very little interference to cause a transient but severe disturbance, I feel that we must be cautious unless the changes produced are of many days' duration and associated with corroborative evidence in the way of bacterial counts, increase of leucocytes and possibly of an alkaline reaction.

Another unsatisfactory factor in this and other work of a similar kind is the amounted injected, *e.g.*, 1 c.c. of mastitis milk or culture. This is large and contains a far greater number of organisms than could ordinarily get in *via* the teat canal. Savage, 20 years ago, preferred to infect the duct with culture from a solid medium on a small loop, but even that meant placing in the canal a number or organisms such as seldom get there otherwise. No worker having once found a strain that would consistently cause mastitis in large doses, seems to have injected decreasing numbers of streptococci in an attempt to arrive at something approximating a minimal infecting dose. The cost of subjects for experiment is obviously one difficulty in the way of such work.

"In considering this question one must also remember that heifers may be infected before calving." In fact one worker, Strenström, believes that this gives the key to the usual method of infection, which he believes hæmatogeneous following ingestion of streptococci.

A few attempts to set up disease by swabbing cultures on the mouth of the teat canal have failed, as has also tying a cup containing mastitis secretion or culture on the end of the teat for 12 hours or more.

Summarising, it may be said that, as regards mastitis streptococci, although the injection of relatively large doses *via* the teat canal has often only produced a moderate disturbance, it is the only method that has succeeded in producing any disturbance. A cautionary word may be added: an injection of any kind into the teat canal will cause a transient change in the character of the milk.

Development.

Arguing from the occasional report of an actual outbreak of mastitis, in which a number of animals show rapidly developing symptoms in quick succession, there must exist certain strains of streptococci which produce an acute type of mastitis with a very short incubation period. In our own work we have learnt to recognise certain non-hæmolytic streptococci which are found only shortly, if at all, previous to the development of clinical manifestation, and which lead to a rapid and often complete loss of the affected gland. Apart from this group, the most common causal type of streptococcus is one which is found in a large number of quarters, showing little if any obvious alteration in the gland or in the milk secreted.

In the past 2½ years we have examined about 10,000 milk samples from 1,014 milking cows in 18 herds, and the average proportion of cows infected with mastitis streptococci is 41·5 per cent., the percentage varying in different herds from 11 to 65 per cent. It will be readily understood that less than 10 per cent. of these were clinical cases of mastitis and that at least 60 per cent. had never shown any signs of udder disturbance. Yet a large percentage showed the germ of udder disease.

There is at least one worker (Steck) who believes that all cows suffer from mastitis of some degree or other, due commonly to streptococci, but frequently to other organisms such as staphylococci. His view is to a large extent based on the fact that nearly all samples of udder secretion, although taken in a sterile manner, show bacteria of some kind, and that he has been able to find other evidence of early pathological change in a large percentage of cases. There is no reason to disagree with Steck when he says that nearly every milk sample contains some bacteria, but I venture to suggest that it is a slight exaggeration to regard every cow harbouring bacteria as affected with mastitis. A large proportion of the quarters which harbour bacteria show nothing except small numbers of staphylococci which are not commonly associated with clinical disease, and these quarters seldom show any evidence of alteration in the amount of sedimentable material or reaction. On the contrary, a variable proportion of quarters show small numbers of streptococci. These are of importance because they are frequently associated with other evidence of abnormality; and because wherever mastitis has been investigated streptococci have been found to be the organisms usually associated with it.

One of the earliest phases of our work on mastitis was to examine at weekly intervals for three months a series of 20 cows, about half of which were infected with hæmolytic streptococci. Three cows infected with hæmolytic streptococci were also examined at more frequent intervals. The purpose of the work was to study the occurrence and persistence of the various bacteria found in the udder. Individual samples from each quarter were plated in 5 per cent. ox blood agar and read after incubation for 48 hours at 37° C., the number and type of colonies being ascertained. It was found that, with few exceptions, the bacterial flora of a given quarter were constant. About half of the quarters showed nothing more than a small number of staphylococcus colonies (10-100 per c.c.). Two quarters of one cow nearly always showed a larger number of these colonies. The remaining 40 quarters showed practically constantly, either hæmolytic or non-hæmolytic streptococcus colonies according to the quarter. The only variable factor was the number of colonies shown by the quarters harbouring streptococci. Certain quarters always gave innumerable colonies on the plate made with 1 c.c. or 1/10 c.c. of milk, i.e., more than 1,000-10,000 per c.c., or even larger numbers up to 1,000,000 per c.c. But other quarters, and these were more common, showed a marked variation in the numbers of colonies which developed, 1 c.c. of milk giving perhaps 100,000 one week, 10 to 100 the

following, then perhaps again 100,000. It was this discrepancy between the counts of successive weeks that made it necessary to examine the milk of six cows more frequently, two or three times a week. Still the counts rose and fell sharply.

Other methods of determining disturbance of the milk secretion which we have used are the deposit test and the reaction tests. In quarters affected with streptococci these also tend to show persistently a disturbance of a latent character. Their nature, however, prevents them from showing such marked changes at successive examinations as does the bacterial count; moreover, they are only late reflections of the streptococci and therefore lose in sharpness. In actual practice we have not been able to correlate the streptococcal count and other evidence of disturbance. This is readily explained when it is realised that the effect of a rise in the numbers of streptococci on the amount of sedimentable material or reaction will probably take a day or two to develop, and that by that time the count may have dropped again. As a result, a coincident low count and high deposit and reaction would be obtained with the same sample of milk.

Certain quarters were examined up to the end of one lactation period and in part of another and, generally speaking, it was found that the numbers of streptococci increased towards the end of the lactation period, clinical manifestation in the way of altered milk often occurring.

Summarising, it appears likely that with the type of streptococcus that most commonly causes mastitis, infection occurs a long time before actual clinical symptoms are shown; and that if the number of these not very virulent organisms is not too great, only a mild degree of disturbance occurs. This is probably not clinically recognisable, and soon disappears. The streptococci may not, however, be eradicated, but remain in the udder where they are mechanically removed by milking or destroyed by tissue agencies at about the same rate as they multiply.

At some later date, due to chill, mechanical injury, or incomplete milking, they are given an opportunity to produce a bigger streptococcal population than is usual, or than can be dealt with by the normal defences of the udder. The result is a more or less transient disturbance possibly of a clinical character, the fore milk being definitely curdled, or other obvious symptoms being shown for a day or two. These symptoms are probably only known to the milker, who regards such change as negligible and in no way associated with definite mastitis or garget. This attitude is very evident when one is taking samples at the farm and endeavouring to collect information regarding the past history of the various cows. Unless one specifically asks whether the cow has not at some recent date shown a few clots the detailed information necessary in putting together the clinical picture of mastitis, is not forthcoming.

That the mild and temporary changes are associated with the severe forms of chronic mastitis is, nevertheless, clear. If an infected animal is regularly and completely milked and subjected to no untoward conditions it may remain apparently normal for a long period, the balance between the bacterial invaders and the udder defences being maintained; but every time that conditions are such as to weaken the defence mechanism or assist the multiplication of the streptococci—and incomplete or irregular milking are probably common unfavourable conditions—there is the danger of a serious exacerbation. It is only when this supervenes that the infected quarter becomes recognised as a diseased quarter.

Under normal conditions such quarters do not usually become free of streptococci, but the disease process recurs until the actual gland tissues become replaced by fibrous tissue or atrophied. Another factor which rather insidiously increases the loss from mastitis is the fact that in the latter part of the lactation period the alterations in the milk become more marked, and the duration of the lactation period is often considerably shortened.

The beginning of a new lactation period may mark a new era of streptococcus freedom. According to some observers this is especially likely if the dry period has been of more than normal length. More commonly the quarter again excretes streptococci of the same kind.

The Spread of Infection.

Under ordinary conditions this is not rapid; one or two quarters or an udder may have a persistent large streptococcal population yet the other quarters of the same cow remain healthy for long periods. In the series of observations made at weekly intervals which have already been mentioned nearly all the originally free quarters remained free, although they belonged either to cows infected in another quarter, or were milked by workers who also milked infected cows. Observations made in other herds have made it clear that the spread of the organisms, causal of chronic streptococcal mastitis, is slow.

There is one more aspect of the epizootiology of mastitis which I would like to consider briefly, that is the bearing which the facts and probabilities mentioned have on our methods of dealing with this disease. Firstly it is possible, if not practicable, to attack the disease at a much earlier stage than has usually been done hitherto; and there is no doubt that it should be attacked before obvious tissue changes have occurred. From an experimental point of view we have for about two years been attempting to control mastitis and the incidence of streptococci by actual segregation or sale of infected animals, or by insisting on these being milked last or by separate milkers. This work is still in progress, but as regards infection with hæmolytic streptococci it might be said that in one herd where carriers have been removed no further infection has occurred. On other farms where separation has been impossible the results have also been encouraging, though it is yet early to form any definite conclusions. In practice, however, such methods are unfortunately not easily applied.

Secondly, it is clear from a consideration of the way in which mastitis develops that, should streptococci be present at all, they will best be prevented from multiplying by regularly and completely emptying the udder; in particular is this necessary towards the end of lactation. Thus will the majority of the streptococci be actually removed whilst those that remain will be constantly diluted by the new milk which is being secreted. In actual cases of streptococcal mastitis there is considerable evidence for believing that very frequent and complete milking has a favourable action and may cause the milk to become practically normal.

Discussion.

Mr. F. A. Davidson: Before opening the discussion on Mr. Stableforth's paper, I have to thank him very

heartily for so willingly granting my request to give it, both from the point of view of the Secretary and that of an official who meets this disease daily. The estimated losses mentioned are common to any part of the country and to them could be added veterinary expenses and the fact that any cow with one or more quarters affected is usually disposed of as fat at the end of her lactation period. In this district the drop in value is roughly £3 10s. to £5 per quarter, according to the top price of the cow. The estimates given for other countries as regards the prevalence of streptococcal mastitis would, I think, apply equally well to this county. I agree with Mr. Stableforth that there is no doubt a latent period, which is often not observed by the majority of dairymen; in fact, it is quite a common occurrence to find a slight alteration in the texture of the udder, which can only be accounted for by some infection at a previous date, and yet one can find no history of a previous mastitis. These cases where there is a slight integral variation are often rather suspicious of commencing tuberculous mastitis and repeatedly when, for this reason, we examine the milk from such quarters we find short-chained streptococci.

The method of infection, as Mr. Stableforth indicates, is still hazy, but there are one or two points to which I would like to draw attention. The first is that in the cases quoted, where infection was made by the teat canal and the abnormal condition was only transient, it must be remembered that otherwise there was no abnormality in the condition of the cow, such as being exposed to draughts, injuries of the udder or teat canal or that the animal recently calved. I think that, if certain of these experimental cows, which showed transient mastitis, had been exposed to any of these conditions, they would have subsequently developed a typical attack. As in other diseases, I am of opinion that the organisms are situated in the teat or milk sinus in a large number of cows and it is only when these adverse conditions arise that the animal is not able to hold the infection in check. The second point is that one often sees in a herd a series of cases which can sometimes be definitely traced down the byre from one cow through the same milker, and it seems probable that the reason for this is repeated reinfection from the originally affected animal, especially as the teat and teat canal are repeatedly massaged over a fairly long period. In support of this the experimental evidence shows that if the teat is massaged, while the syphon introducing the infection is still in the canal, infection of the quarter is aided.

Mr. Stableforth has mentioned the possibility of infection by ingestion, etc. Now I feel that ingestion can be more or less ruled out of the question, but I think it is important that we should consider septicæmic infections of the animal during its previous life and especially as a calf. In particular, I would mention so-called white scour, navel-ill, and retention of the placenta. From observations, not scientifically accurate I must admit, I feel that in such conditions it is possible for foci of the infection to be set up in the body and remain latent for some considerable time, and possibly the mammary gland is one. While out East I was in a position to observe the animals under my care fairly accurately, and I observed that the majority of heifers developing streptococcal mastitis before or after calving, had a previous history of such a septicæmic condition. Also, my attention was recently drawn to a case where a local herd was infected by a mastitis, which appears due to a diplococcus, but may only be a form of streptococcus. The trouble had started with a particular cow, which was isolated in some boxes and the milk from her apparently healthy quarters fed to calves, as is the common practice. In consultation with the local veterinary surgeon, the mastitis was more or less effectively dealt with, but at a later date the latter again consulted me, with the owner, in connection with the fact that all the calves, bred on the place, had been dying for some time. I arranged to have an ailing animal killed immediately and made a rough-and-ready microscopical examination of various parts, including the umbilical cord, which seemed to be the seat of the trouble. These observations incline me to believe that the trouble was caused by the same organisms as the mastitis, as the date when the calves commenced to die was traced back almost to the time of the arrival and affection of the first cow. It was recently reported that the same organism had been isolated from cases of retained placenta and mastitis, occurring in the same herd, though this, of course, would be a case of infection *via* the teat. Therefore, I think we must consider the possibility of infection by way of either the blood or lymph streams. I have no doubt that there are several cases which develop fairly rapidly and acutely, as one finds in certain outbreaks of the disease that, when one cow is noticed affected, there are two or three more cases after an interval of two or three days, until the outbreak is checked. Mr. Stableforth's work on the variation of streptococcal content of affected quarters agrees with what we find here and also the fact that, when the milk of apparently healthy quarters is examined in cases of mastitis, it is quite common to find one or more of these containing large numbers of the causal organism. There is no doubt that we must agree with the author that there is a large number of cows which might be termed latent cases or "carriers," and as long as nothing untoward happens there is no evidence of a definite mastitis, but it seems quite possible that they may act as sources of infection to other cows, which do develop a typical attack of the disease.

I would ask you specially to note Mr. Stableforth's suggestions for the prevention of the spread of infection, especially that in regard to the complete milking out of *all* udders. For some time past these have been our routine instructions to owners, though we have not stressed the importance of complete emptying of the udders, except in those cases obviously affected, but after reading Mr. Stableforth's paper it is quite evident that this should apply to the apparently healthy cows. In addition to the preventative methods put forth by the author, I would add the washing of the hands of the milkers and udders of all cows with a weak solution of formalin or potassium permanganate. Where this latter precaution is taken I have noticed that herds with the ordinary sores on the teats clear up quickly; therefore, I should think this precaution would be of great assistance in the prevention of mastitis.

Mr. Stableforth has not given any information on vaccination in his paper and I would be interested to hear his remarks on this aspect of the problem, because I have assisted practitioners in this work during the last year or two and, so far, can give no definite information, either as regards stock or autogenous vaccines. With regard to the former, it appears to me that if they are to be of any use they must contain strains of organisms taken from cases in this country, as the majority of these stock vaccines are prepared on the Continent. The only more or less definite conclusion that I have come to with regard to vaccination is that during the milking period of the affected cow all that can be hoped for is that it holds the exacerbation of the disease in check and the most successful results are effected during the dry period.

I intended referring here to a type of so-called "soft weed," which we very commonly meet in this district and very closely resembles the mastitis described in Mr. Stableforth's paper. So far I have only observed a diplococcus as the causal organism, but it is very possible that this may be a strain of streptococcus, though we hope to have this point cleared up in the near future. However, I think it advisable to confine my remarks purely to the type under discussion.

Mr. N. McAlister said that he was very pleased to have that paper that day as he was meeting a large number of cases of that type of mastitis in his district and found practically whole herds affected. It was in June that he found the outbreaks started and he did not think that insufficient milking contributed to the cases in any of his dairies as they were what were called "rented dairies," *i.e.*, cows hired out to the dairyman at so much per cow and, therefore, they were thoroughly milked out. He did not think they had really found the cause of spread of this disease, as he had cows suffering from it in herds in

which the milkers were very careful as regarded all the points mentioned in Mr. Stableforth's paper. Personally, he thought milking machines, if properly kept, were much safer than milking by hand, and the act of calving or retention of the placenta were not important points, as the cases occurring in animals so affected were not infectious.

As regarded Mr. Davidson's suggestion that disinfectants should be used, he considered them useless, as when cow-pox broke out in a herd he found nothing would stop the spread of this disease. He had been carrying out a good deal of work with vaccines and found that autogenous ones were useless during the period of lactation, but very successful when the cows were dry. Stock vaccines he found useful for treating the cow during the period of lactation, as they held the disease in check without completely eradicating it and saved the udders until the animals dried off and could be more effectively dealt with. He had evolved what he found a very successful method of finding affected cows, which was to use an ordinary pint measure covered with a fine sieve, and weekly he instructed the dairyman to take the first few drops from the teats of each cow through the sieve, when any clots were promptly and very easily observed, even in the preliminary stages. He concluded by thanking Mr. Stableforth for his paper; he hoped that in his reply the essayist would be able to give them some information to help to combat what was a very serious scourge in that district.

Mr. O. Stinson referred to the great loss from that disease in his district, as once a cow was affected in one or more quarters his clients usually preferred to sell out at the calving or milk them through and take what they could get for them. He had noticed outbreaks particularly in herds with histories of " white scour " and retained placenta and recently he had seven cows affected in a herd of 35 and all of these had previous histories of such disease. He found that outbreaks varied very much from year to year and considered that the conditions were not studied enough: he had observed that when animals were lying out on cold wet nights the number of cases increased. He wondered if, when animals were lying out at grass during the summer, it was possible that the large quantity of albuminoids in the grass had any effect on the incidence of mastitis, especially in heifers, as he often found that it was at this time of the year that one observed premature secretion of the udder, which, if not attended to, might be followed by a lowering of the resistance of the udder and mastitis.

He had kept statistics in herds with mastitis with regard to sore teats and found that 33 per cent. of cows which did not develop mastitis had sore teats, but, on the other hand, 75 per cent. of those becoming affected had sore teats. He found that cleansing of the teats after removal of a placenta had effectively eliminated those cases which occurred after retention of the placenta. He would like to hear the experience of those members who had used preparations of collodion and tar with iodoform during the summer.

As regards treatment, he had had very good results with extensive and prolonged downward massage, accompanied by stripping of the udder. During the first two or three days of a case he recommended massage for five to 15 minutes every hour if possible, and found there were very few cases which did not show good results. He had had good results with autogenous vaccines.

Mr. G. A. Sangster had not much to add to what the previous speakers had given, but he would like to ask Mr. Stableforth if he could indicate if, and when, it was safe to use the milk from a cow with an attack of mastitis, both as regarded the apparently healthy quarters and a quarter which recovered and again secreted apparently normal milk. He wished to thank the essayist for the trouble he had taken in writing the paper and attending the meeting that day.

Dr. E. Armstrong thanked the members of the Division for kindly inviting him to attend their meeting that day, as he was very interested in the subject from the bacteriologist's point of view and had come to learn. He would only like to reiterate the question raised by Mr. Sangster with regard to the human consumption of milk from a cow which had had an attack of mastitis.

Mr. R. Simpson said it was essential, before any progress could be made in combating that disease, that some easy method be found for earlier detection of cases. So far he had found brom. cresol useful and practical in the majority of cases, but he did not think that by this method outbreaks were observed quickly enough. He considered sores on teats important and was very doubtful of results from vaccines. Autogenous vaccines were all right up to a point, but in his view latent cases often flared up following the inoculation. His observations led him to believe that udders which had been affected with streptococcal mastitis were more susceptible to tuberculosis and in the majority of cases where the latter developed quickly he found a previous history of a streptococcal infection. In his district very successful results had been obtained with the application of tar as regarded in-calf heifers and dry cows. However, in spite of all that had been, and was being, done he considered that the losses from mastitis were exceptionally severe.

Mr. O. Stinson observed that he had very successful results from the tar applications. On one occasion a certain group of cattle were all dressed except one and this was the only animal to develop mastitis during the summer.

Mr. N. McAlister also spoke to the success he had had with dressings of tar and the very encouraging results from the mammary injection demonstrated at the Ayr Congress. He considered that flies were the trouble as regarded outbreaks of mastitis in yeld animals.

Mr. J. Bell remarked that for years tar had been used very successfully in his district on " stripping " cows.

Mr. J. Waddell said that recently Ayrshire herds, with large numbers of in-calf heifers going on the hills, had been using teat dressings with encouraging results.

Mr. G. W. Davidson stated that about five years ago, when he came to that district, summer mastitis in dry stock was a scourge and 50 per cent. of in-calf heifers were calving with one or more quarters useless. The tar dressings, along with iodine, which had later been dropped, were used in one or two herds with such encouraging results that the practice was now becoming universal. The method he suggested was to use a flat basin containing the melted tar and press it up against the udder, making sure that the long hairs on the udder proper were plastered down over the teats with the tar, before it hardened—this helped to make it adhere longer. It was necessary, in cattle which had milked, to make sure that the udders were properly emptied and in a healthy condition before the applications and he considered it essential that the animal should be examined at least once a month to make sure that there was no tendency for any of the quarters to " gather " and also to see if a further application was necessary. It was rather interesting to note that, at one of the first places at which his attention was drawn to this summer mastitis in heifers, the farmer assured him that there were never any cases until a few days after the first sheep in the same lot of fields were struck by fly; it was now his custom merely to apply the tar about the time that this occurred and he had had no further cases.

Mr. A. Young thanked Mr. Stableforth very much for giving them the paper that day, though he wished it had been of more use to practitioners, but perhaps that would be remedied in the reply. In his district he recognised three forms of mastitis—acute, sub-acute and chronic. Personally, he thought practitioners need only worry themselves much about the acute, as in the other two types the farmer was left with the cow, but in this one 50 per cent. of the animals died and the only treatment appeared to be to cut off the teat, if the case was seen in time. Summer " Weed " was known there as " Udder Clap " and he had found it occurring in dry cows, in-calf and yeld heifers, and it was very often fatal. No doubt the commonest form of mastitis, however, was the sub-acute, but, as he said before, the farmer in this case still had the cow after the attack was over and so far in that type he had had encouraging results from vaccination during the dry period.

The Reply.

Mr. Stableforth, in reply, said that the many and varied points raised in the discussion had added much to the pleasure that he felt in being among them, because they had made it so evident that mastitis was a subject of importance and intense interest to them. Their President had expressed the wish that his essay had dealt with the acute forms of mastitis. He realised that the acute form was sometimes of crying importance, but he still felt that, at least in the districts with which he was acquainted, it was not common; in fact, in herds which had a constant percentage of clinical chronic cases, perhaps as high as 10 per cent. and a much larger proportion of latent cases, it was rare to meet an acute case. For that reason, as the time for discussion was necessarily somewhat limited, he had confined his essay to the chronic form of streptococcal mastitis; for the same reason he had not included the so-called "Summer mastitis."

Nevertheless, as most speakers that day had referred to that form under one of its many names, he would deal briefly with it before replying to the other points raised. In the course of their work at the Research Institute at Camden Town they had frequently encountered it. It was well distinguished from the chronic form of streptococcal mastitis by the fact that it occurred most frequently during the summer months in dry cows or maiden heifers at pasture, and caused a different clinical picture. The course was generally chronic and associated with necrosis of the affected portions of gland and subsequent suppuration, abscesses sometimes breaking through the skin of the udder. An unpleasant odour and other characters showed the origin of the secretion in the break-down of necrotic material. The causal organism incriminated in this and other countries was the *Bacillus pyogenes*. Flies had been suggested as the possible transmitting agents, but the question was an open one. He had listened carefully to the remarks of the many members who had related their experiences with teat sealing.

Mr. Stableforth asked that the members would forgive him if, where two or more speakers had asked a similar question, he answered them at the same time. The first point, raised by Mr. Davidson, was concerning the lack of success of certain attempts to infect *via* the teat canal; this Mr. Davidson attributed to lack of auxiliary factors such as recent calving, draughts or injuries. He agreed that these factors should always be considered in any attempted infection. There was no reason to believe that they had especially been ruled out in the experimental work so far done; in fact, one German worker, as he had stated in his essay, reported that slight injury to the teat canal did facilitate the production of disease. As they had already read in his paper, he (the speaker) and his co-workers had shown that a large number of cows harboured the mastitis streptococcus and it only needed some untoward circumstance to precipitate clinical disease. He was very interested in the series of cases in a herd which, Mr. Davidson said could be traced definitely to follow one milker, and thought that a few really definite cases of that occurrence should be carefully recorded. (He would be grateful if in such a series he could examine milk from each cow to prove the likeness of the causal organisms.)

Considering the possibility of a connection between septicæmic infection in earlier life, and especially calfhood, Mr. Davidson had specified white scour, navel-ill and retention of the placenta as possible sources of mammary disease. Mr. Stinson had also referred to this question. The essayist thought that white scour could be ruled out, as streptococci were not a common cause of that condition.

As regards retention of the placenta, the reported results varied, some workers, *e.g.*, Jones, reporting lack of similarity between the flora of the vagina and those of the udder whilst Seelemann and Hadenfeld had recently found a similarity. The question was one which they were considering. Mr. Davidson described an outbreak of disease amongst cattle fed on milk from the normal quarters of a cow affected with mastitis, and concluded that the trouble was caused by the same organism. If that were certain it would be, he thought, a new and valuable observation, but the evidence, as far as he understood it, was not nearly complete, and the remark that the umbilical cord was the seat of trouble suggested another explanation.

Mr. McAlister and Mr. Davidson had both referred to vaccination. He would say little concerning this subject. There was no evidence in the literature that vaccines of any kind, stock or autogenous, were of any value as curatives. Regarding their use as preventatives, opinion was divided, but he thought it could be agreed that stock vaccines, unless incorporating the type of streptococcus concerned or a similar one, were unlikely to be of value. The work which had been done with autogenous vaccines had given variable results but, in experiments adequately controlled with unvaccinated animals, there was little satisfactory evidence of their efficacy.

Mr. Davidson had told him much about "Soft Weed" during lunch and from that and the remarks of other members it seemed to be similar to the chronic form of mastitis as he knew it. It would be necessary to examine the causal organism before forming a definite opinion. The fact that it was described as a diplococcus suggested a difference because, although they frequently found diplococci or very short-chained streptococci, the types of cases in which they were usually found was not the ordinary chronic mastitis. He agreed with Mr. McAlister that disinfectants were probably of no greater value than good washing, but the fact that a certain disinfectant would not control cow-pox, did not mean that it would not be of value in dealing with streptococci or *B. coli*.

Mr. McAlister's method of detecting small floccules in the fore milk was no doubt an effective one in careful hands, and would be even better if the sieve were blackened or covered with black muslin.

Mr. Stinson had said that certain statistics he had kept showed that 75 per cent. of cows becoming affected with mastitis had sores on the teats, whereas only 33 per cent. of other cows had sores. It would be interesting to know the number of cows on which the figures were based and number of herds concerned and how often examination was made. Mr. Stinson's results with frequent downward massage and stripping agreed with those of most workers who had tried the method. Some of the German veterinarians strongly recommended that method.

Both Mr. Sangster and Dr. Armstrong had questioned him regarding the safety of using the milk from a cow affected with mastitis. As regards the first point, the apparently healthy quarters frequently did secrete the same organisms as the diseased quarter, but did not necessarily do so and, in fact, might be harbouring entirely different flora. Regarding the safety of using the milk, there was no sufficient evidence that mastitis streptococci were pathogenic when ingested by animals or man; in fact, the ordinary varieties of mastitis streptococci were entirely distinct from human streptococci biochemically and serologically. The outbreaks of streptococcic sore throat that had been associated with milk were in most instances due to a chance, though sometimes prolonged, infection of the cow's udder from a human being. This was a question they were studying at the present time in the Research Institute in London.

Mr. Simpson had referred to the use of brom.-cresol-purple in the form of papers. This was a method that showed the decreased acidity which was a character of the milk in mastitis. He had recently studied its value, and had to conclude that, unless the test was applied frequently, almost daily, many abnormal quarters would certainly not be recognised in the early stages, and even with daily examination they would in some cases be missed until well advanced.

In conclusion, Mr. Stableforth expressed his pleasure in addressing them that afternoon and his appreciation of their keen interest on the subject.

To slaughter at an early age a calf of the beef breeds which would subsequently develop into a first-class carcass seems to be a waste of good material; and one can only regret the straitened circumstances which have forced this policy on many breeders as a means of securing much needed cash.—*The Times*.

Some Notes on the Clinical Examination of the Cow's Udder.*

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It is impossible to write a paper, for a meeting of this sort, which can make any pretence at covering the whole of the matter involved in the consideration of a clinical examination of the cow's udder. What I have done is to compile a few remarks from notes made in connection with cases which I have encountered in my routine work.

The clinical examination of the cow's udder is important for several reasons. From the public health point of view it is important since it is well known that certain diseases may be spread by milk; and because the Milk and Dairies Act prohibits the sale of milk from any cow which is suffering from a sore on the teats accompanied by suppuration or bleeding, or suffering from any disease liable to infect or contaminate the milk. From the dairyman's point of view it is important since inclusion in the bulk supply of milk from a quarter with mastitis may alter the palatability and marketability of the milk, may alter its keeping qualities and may prejudice the value of milk for butter and cheese making. The practitioner is interested in the subject owing to the prevalence of mastitis and the possibility of preventing a simple injury or a teat abnormality, etc., from causing a definite mastitis.

There is no doubt that huge losses accrue to dairymen annually from diseases of the udder, notably mastitis, but he does not appear to realise that prompt skilled attention to a minor ailment may prevent the onset of mastitis. If more care were shown in the prevention of teat and udder injuries, if the removal of supernumerary teats were more universal and if teat injuries and lesions were more carefully dressed there is little doubt that the incidence of mastitis would fall to some degree. This I mention because I wish to emphasise the opinion that even minor abnormalities of udder and teats deserve attention.

In examining the cow's udder, it is well to look at it and pay heed to any swelling of a quarter; redness; alteration in the position of the teats; to the condition of the teats and the skin of the udder. The udder should be handled. A very much more satisfactory result can be got by handling the udder after it has been emptied of milk (in market inspection we know the difficulty of examining "hefted" udders). The teats should be handled, as any fibrous thickening in these may give evidence of a past mastitis, or where a quarter is abnormal absence of fibrous thickening in the teat may aid in the diagnosis of tuberculosis of the udder. The supra-mammary lymphatic gland may be palpated and, if it can be found, this may aid the diagnosis, but it does not afford a very good guide.

When any abnormality is found, naked-eye examination of the milk should be made to see if it is of normal appearance; if clots are present; if it is watery or if it is discoloured. The odour of the milk should also be noted.

Samples of milk may be taken for laboratory diagnosis. Recently it has been suggested that the reaction of the milk may be helpful, but there is still some controversy on this subject and so far it does not appear to be worth while. When centrifuged the deposit should be carefully examined for quantity, its colour and blood content. Microscopical examination has not only for its object a search for organisms; the cell content should receive attention and the presence or absence of fibrin. In an old-standing mastitis no organisms may be found, but the presence of large numbers of leucocytes and of fibrin will probably indicate that this milk is still unfit for use or, at least, that the quarter is likely to be subject to further attacks of a semi-acute mastitis should the resistance be reduced by cold, etc.

If the clinical picture suggested tuberculosis in the udder the presence of epithelial cells and leucocytes will assist in diagnosis if organisms cannot be found. Fibrin is seldom seen on microscopical examination of tuberculous milk. In the absence of tubercle bacilli, the clinical examination of the udder itself, the appearance of the milk, the character and quantity of the deposit and the microscopical picture, must be taken conjointly and will determine the use of the biological test, which is still the most delicate test we know for the detection of tubercle bacilli in milk.

Cultures should also be made and the method of cultivating the organisms of mastitis is still regarded as the best test for their presence in milk.

I have often heard it said that it is very easy to find an abnormal udder and that the real difficulty is in saying what is the cause of the abnormality. I cannot agree that it is easy to find an abnormal udder. Very often one finds, from a biological examination of the bulk supply of milk, that it contains tubercle bacilli, but on visiting the farm no tuberculous udder is found (a control sample may be negative and suggest that the first test was faulty; but a cow may be voiding tubercle bacilli intermittently or tubercle bacilli may have entered by fæcal contamination; the remote possibility of infection from a human source cannot be overlooked entirely). If the control sample is positive there still remains the possibility that the offending cow is affected only in the lymphatic gland or so inextensively in the udder as only to be found by deep handling of the empty bag; or, indeed, no clinical lesion may be found at all. Again, it may be difficult to find the diseased udder in these cases where apparently normal udders are the harbours of various micrococci and the only indication that something is wrong is an occasional clot on the sieve, etc. In these cases I submit that the examination of the teat for fibrous thickening may be of some assistance.

Recently I had experience of an interesting case of udder infection. A certain herd had had repeated trouble with coliform organisms in the milk. At an early stage in the investigation examination of samples revealed (as expected) that the source of infection was in the cowshed. Precautions were adopted to minimise the risk of fæcal contamination; the cows (although already quite clean) were more carefully attended, the udders were inspected before milking and seen to be perfectly clean, the udder cloths were replaced and washed after use. Sterilisation of utensils was good, the milking machine was found blameless and the water supply (through a cistern) was examined but tests

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for coliform organisms were negative. Still the organisms persisted in the milk. It appeared that, as all other sources had been explored, milk from individual cows must be examined. No abnormality was found in any udder. Group sampling was resorted to and five groups showed coliform organisms in $\frac{1}{10}$ c.c. in all three tubes, two showed coliforms in $\frac{1}{10}$ c.c. in two tubes, and in one sample coliforms were found in 1 c.c.). Eventually the coliform organisms were found to be contributed to the milk from two cows and in each of the cows one quarter only harboured the organisms. A further, and very careful, examination of the udder was made but palpation failed to reveal any abnormality. After removal of these cows no re-infection of the supply occurred until last month, when a bulk sample again contained coliforms. A new dairyman had been employed and he allowed the milk from one of the cows which were known to harbour the organism to go into the bulk supply. Her milk has again been tested and after the lapse of seven months she is still found to be a source of infection.

I do not propose to go into detailed account of the various teat and udder injuries, warts and other growths on the skin, skin lesions and eruptions, variolous conditions, etc.

Teat affections and abnormalities may cause such a definite stenosis that, in the absence of treatment, mastitis is almost sure to supervene. Udder injuries (horn gores) etc., after the acute symptoms have subsided may leave a sufficient induration to suggest the possibility of tuberculous or other infection, but very often the skin will be found adherent, especially where there has been a break in the skin surface.

Small subcutaneous abcesses (boils) are found commonly, and may be situated in such a position that they may lead to contamination of the milk. They respond to simple antiseptic treatment.

Acute mastitis is too well known to receive anything more than mention. The general health of the cow is, of course, disturbed and the result may be fatal. Gangrene may supervene and if the portion does not slough, frequently ends in the death of the cow, sometimes from a secondary pneumonia. The condition may subside and become chronic and lead to induration or atrophy. Various organisms are responsible; notably streptococci, staphylococci and coliform organisms; and *B. pyogenes* may occasionally cause an acute attack. Many other organisms play a part.

Chronic mastitis, then, may start as such or may follow an acute attack. The infection may be so mild as to show only occasionally in the milk or in thickening of the teat. Here laboratory examination of the milk must be made.

The condition may progress to induration with definitely purulent milk secretion; sometimes abscesses may burst to the surface: the condition may progress as an induration and persist as such for a long period, the mucous membrane of the teat sharing in the disease process and becoming thickened, and the milk may resume a normal appearance. These cases are prone to exacerbations (through chill, etc.); the condition may progress to a definite atrophy when nothing but a fibrous mass and a hard attenuated teat remain.

It is practically impossible, without resort to laboratory examination of milk, to differentiate between the mastitis caused by various organisms. Streptococci generally may be said to cause the most pronounced induration and, apart from *mastitidis*, are responsible for the most acute attacks. If pyogenes be the causal organism the whole quarter is usually enormously enlarged and very hard, the teat is definitely prominent and often shows scabby material at its point. The milk is very much altered and contains a large amount of a greenish-yellow tenacious pus. The milk gives off an offensive putrid odour. In this type abscesses which point to the surface are very common.

Diplococci are also responsible for a definite type of mastitis. This condition is apparently common in some districts, but fortunately I have not experienced it.

Tuberculosis of the udder requires to be differentiated from other infections. Generally one reads that a tuberculous quarter is enlarged, indurated to a stone-like hardness (probably showing nodules) and is painless; and that the milk is normal in appearance and quantity until the late stages of the disease process. The lymphatic gland may be felt and gives a guide in diagnosis. While the above is probably the rule, the rule is certainly sorely tried by the exceptions. As already mentioned, tubercle bacilli may reach the milk and the udder may appear normal, the bacillus may cause the disease in a quarter which is painful and where the milk is definitely altered in appearance and reduced in quantity. I cannot agree that nodules are felt by handling, although there is certainly a more definite suggestion of nodules, or coarse lobulation, when the empty quarter is handled deeply. I have never found examination of the lymphatic gland of any value because, in the first place, I cannot be sure that I will always find it, and secondly, I cannot see that its examination can be of much use, since we know from *post-mortem* examination that the gland is often not affected at all and when it is affected is not enlarged; and it is very often enlarged in other conditions of the udder. I find the condition of the teat very useful in diagnosing tuberculosis of the udder—only infrequently is any fibrous thickening of the teat found. In the diagnosis of tuberculous mastitis we are recommended to examine strippings for the causal organisms; the bacilli may be more readily found in strippings, but if this portion of the milk is examined it must be remembered (where no organisms are found) that a high cell content must be expected; this also applies to samples obtained from cows very early and very late in their lactation period.

The actinomyces may also be the cause of chronic mastitis. I have only found one case and in this it was even doubtful if *Streptothrix actinomyces* was the culprit. The udder closely resembled a tuberculous one; there was a pronounced enlargement and induration of the affected quarter, the teat was normal and the milk appeared normal. My diagnosis was somewhat aided by the knowledge that the cow had very recently passed the tuberculin test. Microscopical examination of the milk did not reveal a streptothrix, but cultural methods found a staphylococcus, a streptococcus, and a streptothrix which may have been the *Streptothrix actinomyces*. I do, however, know of a case in which the *Streptothrix actinomyces* was definitely proved to be the causal agent. Its guilt was confirmed by the examination of pus from an abscess in the udder which had broken to the surface.

One very often finds that the extra quarters which have supernumerary teats have become infected and a very dirty purulent fluid exudes from the teat. These fifth and sixth quarters (if you will excuse the Irishism) may become indurated and on the first examination of the udder it may appear that a back quarter is abnormal, but a more careful examination will usually reveal that the induration is markedly delimited and does not involve

a functional quarter at all. The condition probably is caused by stimulation of the nascent quarter and, as the resulting secretion is not withdrawn, infection results. This is noteworthy chiefly because it may be misleading and an innocent functional quarter may be suspected, and because the infected material may contaminate the milk and may form an additional reservoir for organisms of mastitis. Recently I had an interesting case of tuberculosis in a functionless quarter. Does this mean that the disease originated from a teat infection?

The œdema which precedes calving and persists for some little time after may be worth passing reference. This may be regarded as purely physiological. It does, however, mask any disease process in the udder. It may contribute in the causation of erythema, especially in the region of the groin. Some short time ago there was a case in a heifer which showed a marked "swawm" which eventually led to gangrene of both hind quarters, and only treatment which encouraged separation saved the animal's life.

Discussion.

Mr. A. Gofton said he felt sure he would be reflecting their opinion if he expressed thanks to Mr. Ritchie for preparing and reading such an excellent practical paper. He was very pleased to see the younger members of the profession coming forward and taking their share of Divisional work. He would like it to be understood that any criticism would be offered in a helpful spirit.

The paper had covered a good deal of ground, and Mr. Ritchie had been wise not to confine himself to text-book descriptions, since in public health work, as well as in general practice, particular problems were continually arising, each of which necessitated its own particular solution. One of these problems was that connected with contamination of the milk by coliform bacilli.

He had himself seen the cows referred to by Mr. Ritchie, and could not detect any abnormality. One sometimes encountered a mastitis in which organisms of the coliform group were involved, but Mr. Ritchie's case was the first he had met in which there was continuous excretion of coliform organisms without clinical manifestations.

He agreed that the supramammary lymphatic gland was hard to find. He had heard men attach much importance to its size and appearance; he thought it could be used as an aid in determining the existence of disease in an udder in some cases only. It was, however, frequently quite impossible to place any importance upon the result of its examination clinically. On *post-mortem* examination, one could see its relationships, and realise that only a portion of it was available for palpation. There were many cases where an enlarged supramammary gland could be encountered in the absence of any tuberculosis; *e.g.*, in cows slaughtered while affected with that purely physiological œdema of the udder which was not uncommon shortly after parturition. Mr. Ritchie was also quite right in stating that in many cases of clinical tuberculosis no enlargement of the supramammary gland could be determined. He also thought that its manipulation was of little or no use.

Regarding indurated udders, they should be considered as indicating a suspicion of tuberculosis, but with some other forms of mastitis it was clinically impossible to differentiate the induration from that of tuberculosis. These indurations usually subsided later on, however, and this fact aided in differentiation. The milk from a tuberculous quarter was very often quite normal in appearance to the naked eye, and only a biological test could reveal the existence of the organisms. It was not, however, always safe to assume that a large indurated udder with a definitely recognisable change in the character of the milk was not tuberculous. Quite frequently one might find tubercle bacilli in purulent, urinous milk. It was quite possible to get a purulent mastitis along with a tuberculous mastitis in the same quarter.

In these cases where a bulk sample of milk gave positive evidence of tuberculosis on biological test, but no clinically affected udder could be found on visiting the farm, one always had to remember the possibility of a change in stock having taken place subsequent to the taking of the bulk sample; the particular cow which was contaminating the milk might have been sold, or, on the other hand, she might have developed acute tuberculosis and died or have been slaughtered. The important point was that tubercle bacilli might be excreted in the milk long before there were any clinical signs of the disease in the cow.

In one particular instance a bulk sample had given a positive test, but when the herd was examined no clinically affected cow was found. Group samples were taken, and not until three months after the original findings was the individual cow determined. She showed no clinical signs of the disease whatever. On *post-mortem* no tuberculous lesion could be found macroscopically, but on microscopic examination tubercle bacilli were found in the udder.

In conclusion, he wished to thank Mr. Ritchie for his able contribution.

Major J. G. McGregor said he thought Mr. Ritchie had covered his subject very well indeed and in an authoritative manner. He would like to associate himself with the views expressed regarding the unreliability of the condition of the supramammary lymphatic gland. He had heard a man in England say that he always found it enlarged in tuberculous mastitis. He himself thought it was more often enlarged in cows which retained their cleansing or in those suffering from some septic infection.

He would like to bring up the question of "hefting" cows which were exposed for sale in markets. The condition was frequently seen, and in extreme cases milk might even be escaping from the teats. He wondered how much pain this malpractice occasioned. He was certain that turgidity of the udder could be no guide to the buyer, and that the practice militated against good milk yield. He had known instances of cows purchased through a market when in this condition, which only yielded 700 to 800 gallons of milk during that lactation, but which subsequently gave over 900 gallons. He wondered whether something could not be done collectively to stop the practice.

With reference to the reaction of milk, he had found brom-cresol papers useful to indicate increased alkalinity as a rough preliminary test for use under byre conditions. The papers required to be kept in glass bottles.

He would like to ask how frequently a positive result from testing a bulk sample of milk might be due to fæcal contamination only. He knew that some herds might give 50 per cent. of reactors, and a bulk sample test would reveal the presence of tubercle bacilli. A subsequent group sample, and later individual samples would all be negative, and he was often suspicious that the bulk sample had been positive because of fæcal contamination only.

During the afternoon the thought had occurred to him that if anyone still had doubts of the advisability of eradicating tuberculosis from cattle, the evidence of the difficulty there was in detecting tuberculosis of the udder clinically and the exact realisation of the amount of tuberculosis there was in milk, should be an effective answer to his doubts.

Mr. F. A. Davidson congratulated Mr. Ritchie on his paper. In Dumfries they had found it better to rule out fibrin and cell-content when making microscopic examinations, although the grouping of large cells suggested by Torrance was an aid where acid-fast organisms could not be discovered. Regarding the presence of inflammatory and tuberculous mastitis, he thought a cultural examination was helpful. Minett had described methods in one of the research papers from the Disease Research Institute. He thought there could be no clinical evidence of tuberculosis if mastitis was present, because the inflammatory mastitis masked the tuberculous infiltration, but sometimes one found a dull redness in the gland or a patchy congestion. He agreed that the supramammary lymphatic gland was an unreliable guide in clinical examination. In the physiological œdema of the udder affecting newly-

calved cows the apparent enlargement of the supra-mammary lymphatic gland was due to the œdema below the skin giving a false impression of enlargement.

Mr. Ritchie had mentioned that he had not seen a diplococcic mastitis; they had it in Dumfries, however, where it was commonly known as a "soft weed." They hoped to make more sure of the condition during this winter. The alkalinity of the milk in ordinary mastitis was between 18 and 20 degrees; in this diplococcic mastitis it was eight to ten degrees. In one instance a dairyman had complained of greasiness in his filter-cloths and said one of his producers must have "soft weed" among his cows. He visited the farm and found this was the case. He usually found a "roughness," something like a fleshy udder, with marked differences between affected and non-affected quarters which materially aided in diagnosis. There were often complaints about bad cheeses when "soft weed" was prevalent, because the milk was retained for cheese-making, and caused a foulness in the finished cheese.

Mr. A. Spreull, senr., observed that, with regard to Major McGregor's point about "hefting," it was important to remember that it was sometimes deliberately done to hide a bad quarter. He thought it was very important to stop "hefting" and, in addition, the practice of dealers whose hands were never clean drawing a little milk from half-a-dozen or more cows when showing them off to prospective purchasers. He thought this favoured the spread of any infection there might be and should be stopped.

Mr. J. M. McDougall remarked that he would like to hear an opinion on whether the biological or the microscopic examination of milk for tubercle bacilli was the better. He thought they had power to prosecute in a case of "hefting" if it were severe enough to cause pain.

Mr. W. Scott agreed with various speakers that it was not safe to trust to suspicions of disease in the udder. He had had one rather enlightening experience: he took, on one occasion, samples from the hind quarters of two suspected cows. Microscopic examination was negative. Samples were taken again, and again were negative. A week later guinea-pigs were inoculated and eventually gave positive results; and another week later another set of samples gave positive microscopic results.

He thought there could be no doubt about "hefting" being painful. Cows were distressed looking, ceased cudding, and would not lie down comfortably until milked.

Mr. A. L. Robertson related what he described as a very puzzling case in a cow in the county which showed a hard painful swelling. A sample was taken and on examination showed no tubercle bacilli, but numbers of acid-fast cocci about half the normal size of tubercle bacilli. He had not been able to get these identified. A biological test had proved negative. He wondered whether anyone else had encountered these cocci and could throw any light on their nature.

He agreed with others who had spoken about the painfulness of "hefting"; analogy from the experience of human beings would bear this out.

Major R. G. Anderson raised the question of the position of the dairyman who was supposed to report any suspicious abnormal condition in the udder which was often only demonstrable by handling. The dairyman did not normally handle every cow's udder, and probably had not the necessary experience to be able to appreciate abnormality when he encountered it. The position, as he saw it, needed revision.

Regarding superimposed infections, he thought it was quite reasonable to expect them. He felt that his experience warranted him in saying that the tuberculosis infection preceded the acute infection. He would like to ask, was one always, therefore, justified in stopping the milk from such a cow until the biological test of six weeks' duration had been carried out? He thought that fæcal contamination of bulk samples might arise from the milkers handling the tails while milking—there being frequently contaminated with fæcal matter and therefore tubercle bacilli. With reference to "hefting," people could be prosecuted, and he had seen official circulars warning dealers.

He would like to ask Mr. Ritchie if he could say whether the excretion of contagious abortion bacilli through the udder in cows ever caused any clinically recognisable condition in the udder. He mentioned that chiefly on account of the attention which was being paid to undulant fever in man. Finally, he would like the condition similar to "swawm," but which occurred late in lactation, and did not disappear so spontaneously, discussed by other members.

Major McGregor mentioned that in his experience the type of subcutaneous œdema to which Major Anderson had referred was sometimes found to be of tuberculous origin. He had had milk from cows exhibiting this condition tested on several occasions and had obtained a positive reaction.

Mr. W. Nairn, in calling upon Mr. Ritchie to reply, mentioned that he was very glad to learn that even veterinary officers had difficulties in diagnosing some of the troublesome conditions affecting the cow's udder.

The Reply.

Mr. Ritchie said that he was very pleased that such a good discussion had arisen from his paper. He had often discussed this subject with Mr. Gofton, but this was probably a unique occasion since, for the first time, he would have the last word. (Laughter.) He agreed that the excretion of purulent milk did not rule out the possibility of infection with tubercle bacilli. In his experience, however, he had found that tubercle bacilli could be demonstrated very easily if present in such milk.

Major McGregor had asked how frequently a positive result from testing a bulk sample of milk might be due to fæcal contamination. It would only be conjecture if fæcal contamination was blamed. Mr. Ritchie referred to his paper, where he said there was a possibility of the first test being faulty, of a cow voiding tubercle bacilli intermittently, of fæcal contamination and the remote possibility of infection from a human source.

In reply to Mr. Davidson, Mr. Ritchie said he felt he could not afford to neglect the question of cell and fibrin content in microscopical examination of milk samples; the actual examination of the udder, naked eye and microscopical examination of the milk had all to be correlated when diagnosing tuberculosis of the udder. After Mr. Davidson's description of "soft weed" the speaker wondered if he was correct in saying he had never encountered a case.

In answering Mr. McDougall, Mr. Ritchie referred to his paper in which he described the biological test as "still the most delicate test we know for the detection of tubercle bacilli in milk."

Mr. Scott had also asked the question of "hefting" cow's udders. Mr. Ritchie thought the Protection of Animals Act gave authority for prosecution when "hefting" could be proved to cause pain to the animal. Mr. Ritchie wondered if the organisms which Mr. Robertson encountered were alcohol-fast and, on being assured that they were, he regretted his inability to express an opinion.

To Major R. G. Anderson, Mr. Ritchie replied that he quite agreed there was difficulty with dairymen failing to report indurated udders where the milk was normal both in appearance and quantity. So long as the cow gave her normal quantity of milk many dairymen did not worry about the abnormal quarter even if they did appreciate the abnormality. He wished to repeat what he had said about milk which was definitely altered in appearance—that the tubercle bacilli were easy to demonstrate when present and it was not, therefore, necessary to impose restrictions on the use of the milk and the movement of the cow under the Tuberculosis Order for any length of time. Mr. Ritchie had not seen any abnormal condition in the udder caused by the abortion bacillus; often guinea-pigs which had been inoculated with milk showed lesions caused by the bacillus. He had examined samples of milk from the condition which he called "persistent swawm" and coliform organisms had been found in some.

The Microscopical Examination of Milk for Tubercle-Cell Groups.

By H. T. Matthews, F.R.C.V.S.,
Veterinary Department, City of Liverpool.

The primary object of this article is to assist practitioners who make their own microscopical examinations of samples of milk from single cows, which they themselves have examined and suspect. To deal exhaustively with the subject, which is so rapidly gaining in general interest, would need a book. The present account covers only such parts of it as can come properly within the functions of the general practitioner, with benefit to himself and to public health practice.

The value of a rapid and definite diagnosis is self evident. It has never been adequately stressed that the practitioner possesses a marked advantage over the laboratory pathologist in his knowledge of the clinical condition of the particular case with which he is dealing, and in being able to examine his milk fresh. That such advantages should so often be wasted is deplorable. On the other hand, of course, it is seldom that the clinician has trained his eye to observe properly through the microscope, as he has, or should have, trained his fingers to appreciate varying textures of udder tissue. The man who uses his microscope to diagnose anthrax and scab, who probably examines fæces from his patients, that is to say, one who is not entirely unversed in the use of the microscope, should be able, with a little application and experience, to find the bacilli in three out of four cases of tuberculous mastitis. A much higher degree of efficiency is possible, but is hardly to be expected under conditions of general practice. A common deterrent to making the serious attempt is the time and labour supposed to be involved. Many would cheerfully face the simple technique of preparing the specimen, but cannot overcome the mental hazard of having to search apparent acres of slide under an oil immersion lens. It is the essence of this article that such undirected seeking is largely a waste of time. The actual employment of the microscope should seldom occupy more than five minutes and mainly involves the less strenuous low-power lens.

A full description of the preparation of a specimen for examination is probably unnecessary and would occupy too much space here, but the method is briefly summarised at the end. A simple Ziehl-Neelsen stained smear of the sediment from about 10 c.c. of the milk is all that one can ask the practitioner to make. But there are a few points in the preliminaries that deserve special mention.

The question whether fore-milk, middle or strippings is best was dealt with long ago.[1, 2] The answer is that there is little difference. Long and speedy contrifuging is not only unnecessary but undesirable for a microscope specimen, as cell groups, which hold the greater number of bacilli, tend to sediment first, forming the lowest layers of total deposit. The cream is not worth examining. The sediment of tuberculous milk generally gives a finely granular appearance when being smeared on to the slide, the apparent granules being composed of the cell groups one will subsequently look for. A sticky or slimy deposit, that pulls out into a minute string on the loop and will not smear evenly, usually indicates the presence of cocci, but not necessarily the absence of tubercle. There is no need to treat the slide before staining with any fixative or fat-solvent. Fixing in the flame is quite adequate. The inexperienced will save themselves trouble if they decolourise strongly. The " faint pink " advocated by text books is not good enough for milk, or at least not for the novice. Individual variations in the preliminary technique may cause slight differences in the eventual appearance. The specimens illustrated have all been treated with one part of concentrated sulphuric acid in three parts of commercial methylated spirits.

The cytology of milk, normal and pathological, has been a source of interest to many observers at different times. Only one who has made a long study of the subject can hope to recognise all the different cells and cell-debris that occur, and in point of fact such knowledge has only an academic interest as yet. Torrance[3, 4] observed and recorded the phenomenon of cell grouping in tuberculous milk, but unfortunately had not the opportunity to complete his observations. So far as the practitioner is concerned, for his greater ease and comfort in finding tubercle bacilli, he can ignore all except such cells as go to comprise cell groups. Their recognition, once accomplished, is easy of repetition. It is the first detection that may cause some difficulty to the beginner, and wordy descriptions are of little avail to him. It is hoped that the accompanying illustrations will incite the willing seeker to consult his microscope and find his own groups, when he can check their features against the, unfortunately necessary, verbal account which follows.

The cell which forms the unit of the cell group is the so-called epithelioid or endothelioid cell. Its origin and exact description are matters upon which pathologists differ. The practitioner, as such, is only concerned to recognise its appearance. It is larger than the other cells of milk sediment, stains lightly and generally shows a number of endonuclei or knots on the cromatin network, irregularly disposed within it. This cell is present in many kinds of milk, and of course other material, but in tuberculous milk it tends to appear in the peculiar formations known as cell groups. For descriptive purposes three fairly distinct types of cell-group may be defined, all variations of the same phenomenon of agglutination.

The most easily distinguished is the round cell group. Here the cells are arranged in a circle which may be incomplete in its peripheral or central disposition. This circle of cells is sometimes very clearly margined and separate from surrounding cells, sometimes not. It usually rests on a faint blue haze or background. The cells are not all in focus at once but appear slightly heaped up, overlapping, tumbling over one another, as though the contents of a single acinus had been emptied on to the slide at the one place. The number of cells comprising a good round cell group varies between about twenty and a hundred.

The second type may be called a cell mass. It consists of a closely packed accumulation of the cells, piled on each other, sometimes numbering thousands. It differs from the round group in that it has no constant shape, though its margin is often well defined, in the number of cells, and it contains a proportion of other milk cells intermingled. The cell mass is usually the last place to lose the fuchsin, which indeed is true in less degree of the other forms of cell group, and if decolourisation has

not been very severe the eye is attracted to the spot by the pink.

The third type is the loose cell group consisting of an aggregation of the cells not in close contact with one another, rather interspersed with cells of other kinds, not with any well defined margin, but clearly forming one entity and usually held together by the faint blue background. This faint haze is the feature of cell grouping most likely to be varied by modifications in the preparatory technique, and may be absent, which is unfortunate in that, in company with the lighter staining and large size of the cell, it is one of the points that catch the eye under the lower power lens. The difference between the loose group and the mass is only one of degree in the close packing or the cells, and that the mass has usually collected on and around it more cells of other type.

It must be understood that this hard division into three types is for descriptive purposes only, so that the beginner may be able to discern the more distinct formations first. Having done so he will be better able to appreciate intermediate forms and to recognise that any collection of epithelioid cells tending to hold together is a cell group.

Cell grouping occurs at all clinically discernible stages of tuberculous mastitis, whether pure or mixed infections, and quite probably if one had time to make the investigation it could be demonstrated from the pre-clinical development. Any one preparation from tuberculous milk may contain numbers of all three types of cell group or only one type, or even only one group. The concentration of groups in a smear can be varied very considerably by the depth to which the loop is passed into the sediment. In the top layer there will be comparatively few groups, in the middle a greater proportion and in the depth most. Hence it is necessary to use a right-angled loop and pass it to the bottom of the deposit. The same variation can be obtained by altering the rate and duration of centrifugalisation, and, by taking the deposit first thrown down, one can often obtain a smear composed almost entirely of cell groups, and many of these may hold bacilli. Longer or speedier centrifugalising will sediment more bacilli, and of course, is proper for a specimen intended for animal inoculation, but in addition are thrown down cells of no value to the microscopist, which renders the eventual concentration of bacilli less. There can be no fixed optimum for all types of milk, but it appears sound to advocate less centrifugalisation than is generally advised. Just sufficient deposit to make a good smear is adequate. If the cream is packed into a hard ring at the surface, then the process has probably been too strenuous to produce the easiest results.

Most unfortunately there occurs what may be termed a pseudo cell grouping in some samples of milk from cases of chronic, but non-tuberculous mastitis. The main distinction from the true tuberculous form is that the group gives the impression of lying within a sticky matrix, often shrinking away from its surroundings and thus leaving a clear space. One feels that it would less easily be teased out into its component cells than would the tuberculous group. The cells take the blue stain more heavily. They tend to lie in the same plane, more of them in focus at once, and to be disposed with the long axis following the periphery of the group. In such milk one frequently finds numbers of very small pseudo groups, consisting of about five or six cells only, and another prominent feature is the general distribution in the field of the cells occurring singly with a noticeable surrounding or crescentic haze of blue-stained plasma. The recognition of non-tuberculous cell groups is not always an easy matter for the trained eye and will give some trouble to the inexperienced. Their occurrence seems to be the one obstacle to making a safe diagnosis on cells alone, in conjunction with the clinical examination.

If the above description of tuberculous cell groups be accepted, then Torrance's original assertion that their presence almost certainly indicates the lesion to be a tuberculous mastitis is upheld. Herein lies one of the great values of observing the cytology of a specimen. The practical certainty of the existence of bacilli renders their detection easier than if one is looking half-heartedly for something that might not be there at all.

Tubercle bacilli tend to congregate on, or in the immediate vicinity of, cell groups. That is not to say that all the bacilli are on cell groups, nor that all cell groups contain bacilli. But the general truth of the statement is capable of experimental proof, and in its practical application determines the method of search. The practitioner will be well advised to use the $\frac{2}{3}$" lens to explore the smear for cell groups and to examine only these with the oil lens, ignoring all else. The round group and the cell mass are about equally prolific in bacilli, both more so than the loose group, and as a generality the greater the number of cells comprising the group the more likely is it to prove fruitful in bacilli. It is seldom that the writer finds it necessary to examine more than two or three good cell groups, and the saving of strain is obvious. Where there is a heavy infection or where the smear is practically composed of cell groups and little else, it may be as quick to employ the oil lens alone, but in practice this is infrequent. In such heavy infections great masses of bacilli may be found outside cell groups, but similar masses will also be present on the groups; whereas in less intense cases one occasionally encounters a single cell group containing large numbers of bacilli and detailed search of the whole film fails to reveal any more, or very few. Such are convincing flashes vouchsafed to vindicate one's painfully acquired confidence in the system of neglecting all but cell groups. Occasionally, one must admit, there is a scarcity or even an absence of cell groups in the smear. In that case the practitioner is probably justified, in view of his other duties, in leaving the guinea-pig to decide.

It may be necessary to utter a word of warning. The tubercle bacillus has a definite structure which is visible. Unless decolourisation has been carried a stage further than that shown in Figs. I and II, the inexpert must beware of minute pink granules, especially if they are intracellular, and more especially if they can be made to focus out suddenly into a spot of light. Gofton[2] and others have recorded acid-fasts other than tubercle in milk. But provided the milk is taken direct into a sterile bottle from the reasonably clean teat, and provided every pink dot is not called a bacillus just because it is pink, there should be no trouble. An acid-fast bacillus in conjunction with cell groups is ample evidence on which to act. An acid-fast in the absence of cell groups may leave some doubt. This is another of the advantages of observing cytology.

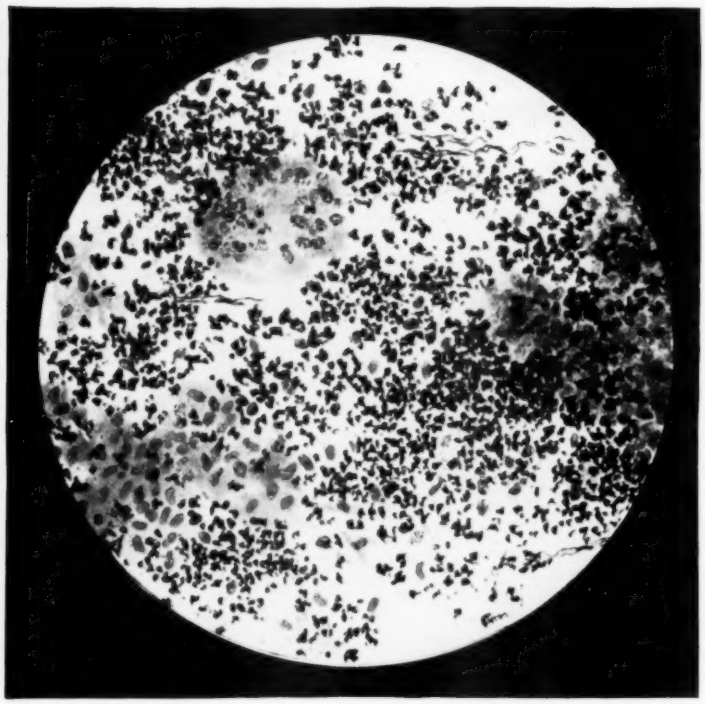

Fig. I.
Three types of cell group. Top, a round group. Left, loose grouping. Right, part of a cell mass. Low power.

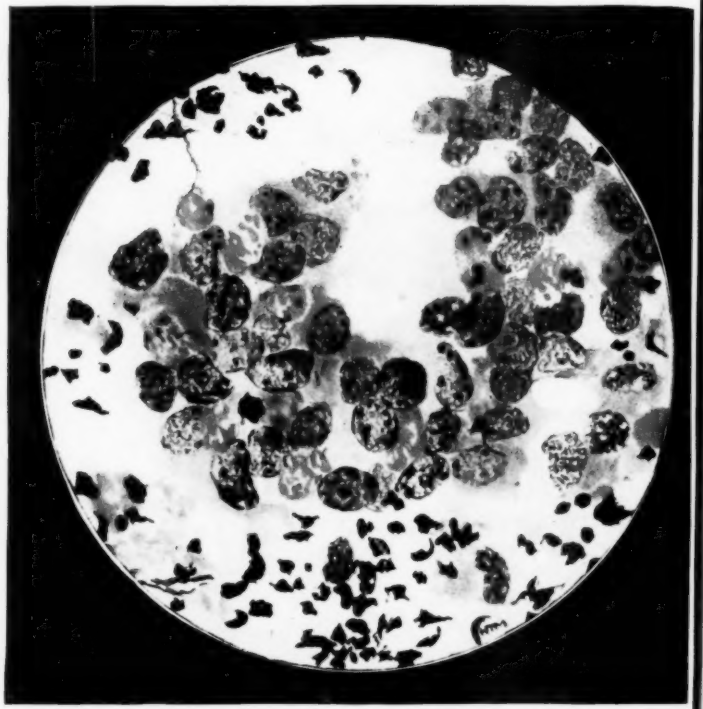

Fig. II.
Typical round cell group, showing bacilli. $\frac{1}{12}$" oil.

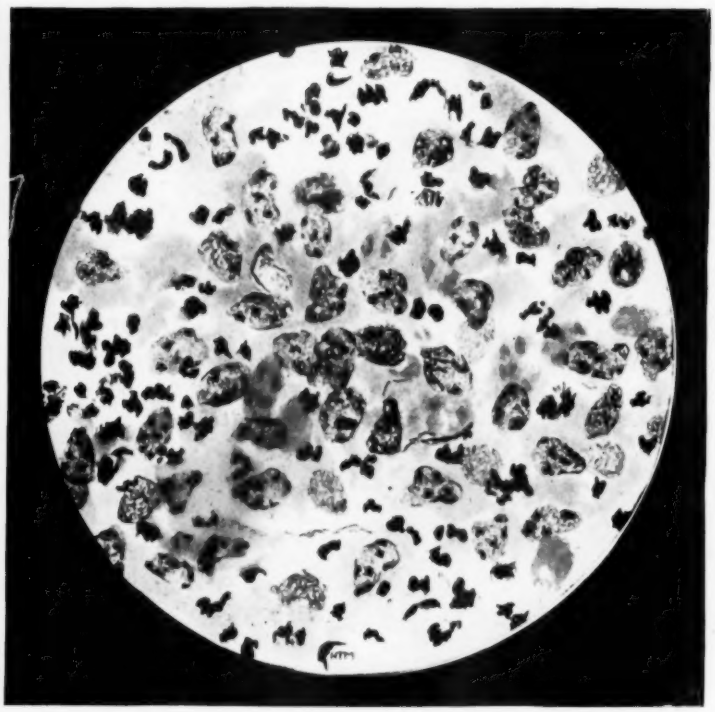

Fig. III.
Loose grouping. Shows bacilli $\frac{1}{12}$" oil.

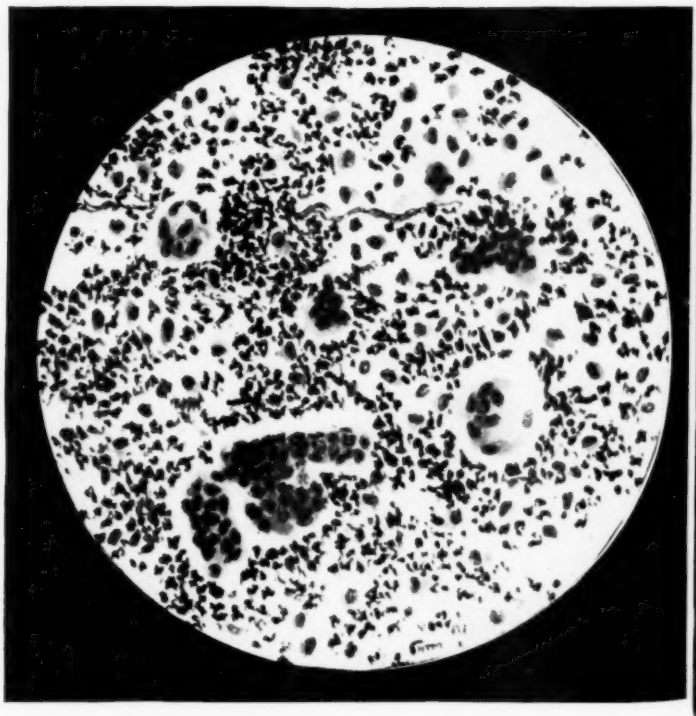

Fig. IV.
Non-tuberculous cell groups. Low power.

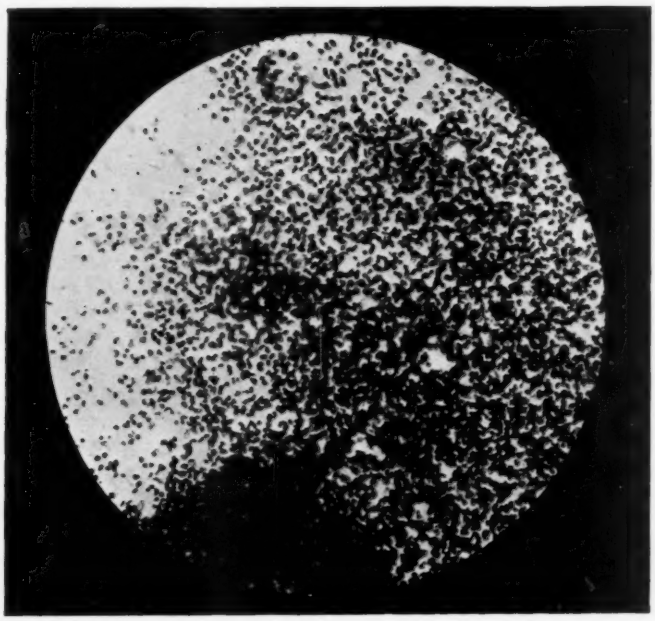

Fig. V.
The three types of cell grouping. Low power.

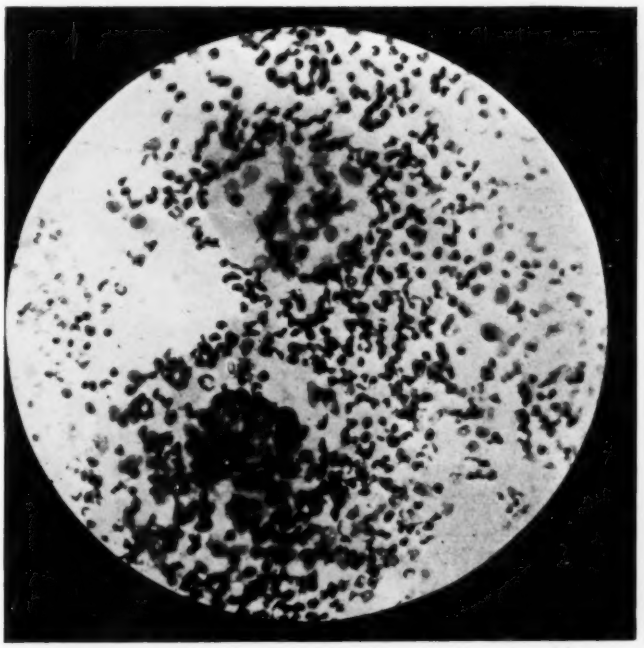

Fig. VI.
Two round cell groups. Low power.

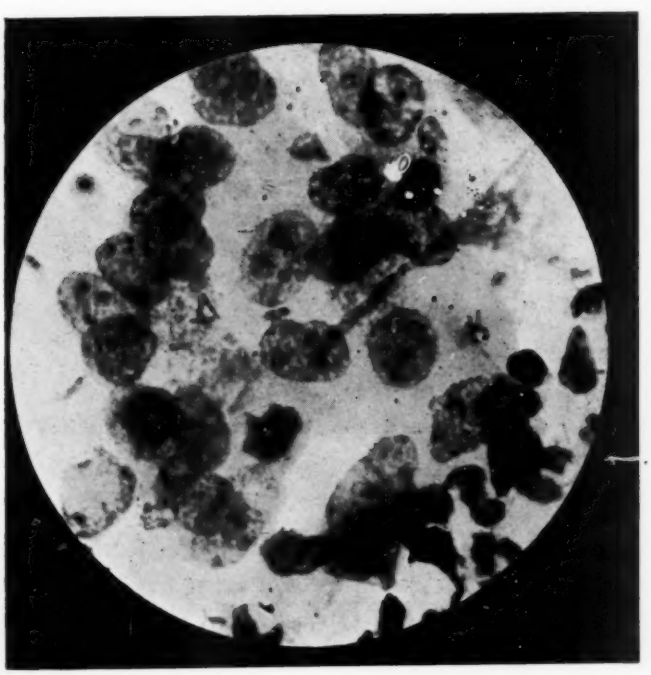

Fig. VII.
Round cell group showing bacilli. Oil immersion.

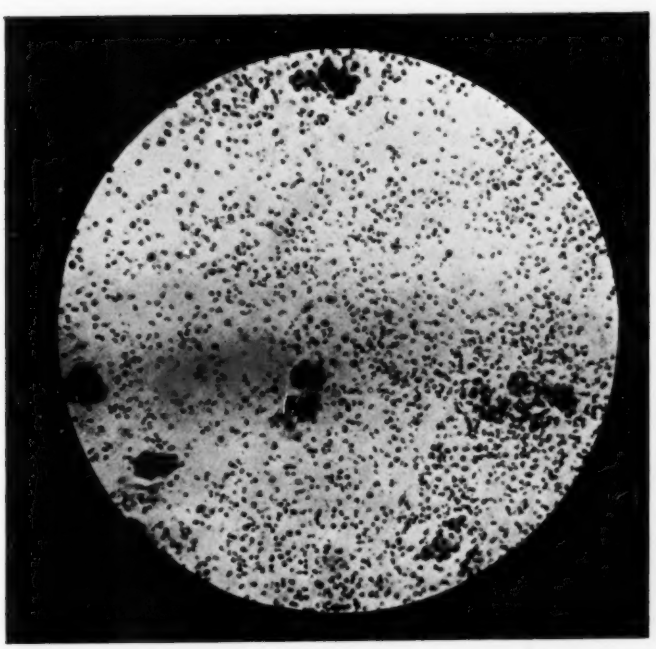

Fig. VIII.
Non-tuberculous cell groups. Low power.

There remains the problem of the negative diagnosis. It is very difficult to say whether a practitioner is justified on his clinical and microscopical evidence in returning a negative and permitting the use of the milk. On the face of it, if the state of the udder was such as to merit the taking of a sample, it would appear to need absolution from blame by means of the biological test. If there is reasonable doubt, the consumer is to have the benefit. But in practice the variations in the clinical presentation, and in individual judgment and skill, are such that the question is by no means so simple. A farmer would have a good claim in law for milk unreasonably stopped. It might even be held unreasonable if the veterinary surgeon had not used the available adjunct of the microscope. But if he has done so, and if the sum of his findings forces him to the strong opinion that the udder is not tuberculous, can he permit the milk to be used? Suffice it to say that the whole-time officer does it every day. But in addition to his more concentrated experience of the clinical aspect of tuberculosis, the specialist is not content with merely a Ziehl-stained slide, except in very few cases. He will, or should, examine a Gram preparation. Even then there is the problem of mixed infections, much too big for discussion here. He may require a second sample from the cow, which involves a second clinical examination. A tuberculin test in the hope of obtaining a negative may be considered. Each case must be decided on its merits and according to the skill and experience of the veterinary surgeon in charge.

Records of Milk Examination Relative to Cell Grouping.

Of 500 samples of milk in series, all from cases bearing some clinical resemblance to tuberculous mastitis, 133 proved tuberculous, 367 non-tuberculous. Of the 133 tuberculous samples it is recorded that cell grouping was observed in 128 (96 per cent.). It is probable that the phenomenon could have been demonstrated in the remaining five cases had further specimens been made from them. In 132 of the 133 cases, the bacilli were found microscopically. Of the 367 non-tuberculous samples 47 (12·8 per cent.) showed pseudo cell groups.

Notes on the Illustrations.

The proper recognition of cell grouping demands examination of the actual specimen. The illustrations are intended only to assist, not to replace, such examination. The drawings are composite, and slightly diagrammatic to balance the inaccurate hardness of the photographs, which of course are correct in detail, but atmospherically misleading. No attempt has been made in the low-power drawings to reproduce accurately the very variable cytology of milk except as regards the cell groups.

Fig. 1.—It is rare to find a single field containing the three types of cell group so clearly defined. Compare with Fig. 5.

Fig. 2.—A very well-defined example of a round group. Compare with Figs. 6 and 7. Bacilli may be found at any part of such a group and at any focus, generally single, sometimes in pairs or clumps.

Fig. 3.—In default of a better group, the formation here illustrated is worth a careful search. The more closely the cells tend to approximate to one another, the greater is the likelihood of finding bacilli.

Fig. 4.—Compare with Fig. 8.

Fig. 5.—(Photomicrograph). The very large proportion of epithelioid cells in this field indicates the likelihood that bacilli may be found almost anywhere in it. The round group at the top is easily recognisable. There is a tendency in the middle of the field for the cells to collect into a loose group. The cell mass at the bottom does not reproduce well. Particularly low magnification has been used so as to include the whole field.

Fig. 6.—(Photomicrograph). The bottom group contains more epithelioid cells, but also more cells of other type, and is less clearly margined.

Fig. 7.—(Photomicrograph.) 1/12 in. oil photograph of the top group in Fig. 6. Contains over 50 bacilli, only some of which can be focussed at once.

Fig. 8.—(Photomicrograph.) Exaggerates the prominence of the non-tuberculous groups, mainly because the smear is unusually thin.

Summary of the Preparation of a Specimen.

1.—Mix the sample well by shaking. Pour 10 to 15 c.c. into a tapered centrifuge tube and centrifugalise until sufficient sediment to make a good smear is obtained. (This will vary from about one to five minutes with a hand centrifuge.)

2.—Pour off and drain, keeping the mouth down.

3.—Pass a right-angled loop right into the sediment and smear on a slide, evenly and not too thin. A smear of about one-half to three-quarters of an inch square is usually ample.

4.—Air-dry and fix in a flame.

5.—Stain with Ziehl's carbol fuchsin, warm, three to five minutes.

6.—Wash with water and decolourise, washing frequently, till no pink remains visible. There are many decolourising agents. One part of concentrated sulphuric acid in three parts of commercial methylated spirits is satisfactory.

7.—Counterstain with methylene blue, half to one minute.

References.

[1]H. Begg in Wallis Hoare's "A System of Veterinary Medicine," Vol. 1, 1913, p. 394.
[2]A. Gofton. *Veterinary Record*, April 9th, 1921, p. 287.
[3]H. L. Torrance. *Veterinary Record*, April 29th, 1922, p. 292.
[4]H. L. Torrance. *Veterinary Record*, October 8th, 1927, p. 875.

By arrangement with the Aberdeen-Angus Cattle Society a consignment of Aberdeen-Angus cattle is being sent for exhibition in the British section of Milan Fair, which will be held from April 20th to 27th. This will be the first occasion on which Aberdeen-Angus cattle have been seen in Italy, so far as the records of the Society show, but it is encouraging that one of the bulls, which is to be on exhibition, has already been purchased by a prominent Italian agriculturist. The consignment of Aberdeen-Angus cattle comprises five bulls and two heifers.

There were 82,816 bulls in England and Wales, and 17,147 in Scotland in 1930. The numbers of premium bulls are respectively 1,543 and 666.

Clydesdales are making headway in Yorkshire. Three stallions have been hired for the Stockton district, where a new society has been formed on what was formerly Shire territory.

Some Remarks on Avian Tuberculosis and its Diagnosis by Means of the Intradermal Tuberculin Test.*

By J. E. Wilson, B.Sc., M.R.C.V.S., Poultry Pathologist, Royal (Dick) Veterinary College.

Before proceeding to demonstrate the intradermal tuberculin test, it might be well to make a few remarks concerning the disease as it occurs in birds.

Hens, pigeons, pheasants, pea-fowl, guinea-fowl, turkeys, swans, canaries, finches and parrots are susceptible. It is not so commonly met with in ducks and geese. Whereas there is no record of the disease in wild birds, any bird kept in captivity is liable to succumb; thus we have encountered the disease in kestrels, eagles, etc.

The disease, as in mammals, is very insidious and many birds in a flock may be affected before the trouble is diagnosed.

Ingestion is the common method of infection, the bird picking food contaminated by the droppings of affected fellows.

Emaciation or "going light" is a prominent symptom in the later stages, being especially noticeable on handling the birds. Often the breast muscles are completely atrophied, as is the case in one of the specimens exhibited. Appetite at first is good, later becomes capricious and in the last stages of the disease becomes greatly impaired, the bird appearing semi-somnolent. Diarrhœa is fairly common and sometimes lameness is met with.

On *post-mortem* examination the liver and spleen are most commonly found to be affected, the lesions consisting of circular nodules, yellow-white in colour and cheesy in consistency, very easily shelled out, and varying in size from that of a pin head to that of a three-penny piece. Lesions are also noted in the intestines, taking the form of nodules protruding from the serous surface and opening into the lumen. The lungs are seldom affected in the domestic fowl and still more rare is it to find lesions in the kidneys or ovary.

Since birds which have intestinal lesions may pass an immense number of organisms in their droppings, it is of the utmost importance to get an early diagnosis. Apart from the certain infection of other fowls, affected fowls are a danger to pigs. There are cases on record of infection in the horse, ox and man.

On the presence of the disease being demonstrated, it is advisable to handle the entire flock, cull all fowls which show signs of emaciation, and apply the tuberculin test to the remainder.

The Application of the Intradermal Tuberculin Test.

Two to three drops, or ·2 c.c., of Avian Tuberculin is injected into the skin of the wattle, care being taken that the injection is really intradermal and not into the deeper tissue. With practice the operator soon learns to appreciate the different resistance offered by the skin and the wattle tissue, and the tense swelling of the little blob of fluid also indicates that the tuberculin has reached its proper billet.

Owing to the delicate nature of the wattle a fine needle is a necessity. We find a No. 19 needle very satisfactory.

A hot œdematous swelling of the injected wattle constitutes a positive reaction, the uninjected wattle being a control. The reaction may be read at 24 hours, but persists to 48 hours and is receding at 72 hours.

Many reactions can be read at a glance, as, for example, those demonstrated, but others require handling and careful comparison of the wattles. It is our custom, based on *post-mortem* findings, to cull all fowl which show a diversity of thickness of wattles, however slight that diversity may be.

Following the test, the usual sanitary precautions must be carried out.

* Presented to the Annual Meeting of the Scottish Metropolitan Division, N.V.M.A., held at Edinburgh, on January 28th, 1931.

Persistent Recumbence after Milk Fever —Decubitus.*

By P. Wilson, M.R.C.V.S., Lanark.

I suppose most country practitioners come quite frequently into contact with cases of this kind, and find them on the whole rather unsatisfactory cases to handle.

The condition may last from a day or two to several weeks or even months. I once saw a cow which, the owner said, lay for three months, and then rose. She happened to fall ill in a cattle court, in which there was plenty of dry manure and straw, and she was simply fed, and allowed to attend to herself otherwise, with the favourable result stated. But all cases do not fall ill under these favourable circumstances.

The condition is generally spoken about as a weakness of the back, and quite frequently as a paraplegia or paralysis, with the seat of the trouble located in the spine. From my own experience, I consider that the causes of this condition are various, but that it is seldom, if ever, due to spinal disease, for the reason that one never finds any interference with either defæcation or micturition.

Personally I should set forth the principal causes somewhat as follows:—

1.—Incomplete recovery from the primary disease (milk fever).

2.—Dread and reluctance to try to rise. Both these causes appear to me to originate from the same agencies, *viz.*, the animal has either tried to rise before it was able to do so, and its feet have slipped from under it, resulting in the animal abandoning all attempts to rise for some time afterwards, or been forced by an impatient owner to try to rise, before it is able, simply because he thinks it has lain long enough, and ought to be on its feet. Smooth cement floors, with practically no foot-hold when the least damp are greatly to blame for this. And a cow can be a tremendously stubborn animal, when once it takes an idea of any kind into its head, and the more it is compelled the more determined it becomes not to submit.

3.—Broken bones, mostly the femur.

4.—Dislocation of the hip joint.

5.—Paralysis of certain nerves.

6.—Injuries to muscles.

* Presented to the Annual Meeting of the Scottish Metropolitan Division, N.V.M.A., at Edinburgh, on January 28th, 1931.

When one meets with a case, either that one has treated from the onset, or, as often happens, that has been treated by the owner or another layman, it is always well to consider the possibility of No. 1 being the cause. With regard to 3 and 4, all that need be said is by way of warning young men, when called into a case, to be sure to have the cow turned over on to the other side, so that the side she is lying on may be examined. If this precaution is neglected, the actual cause of the condition may be missed for some days, until the animal is conveniently found on the other side at a future visit.

I believe that more than one nerve, and that various muscles of the hind legs, can be injured by continued pressure, and strain. To me it appears that the majority of these cases are due to carelessness, and awkward and rough handling when the cow is down and more or less helpless, rather than to any injury done by the cow to herself during the initial stages, when she is struggling more or less.

To begin with, most stalls are too short to accommodate a milk fever cow comfortably, and the result is that she very often ends by lying in the dung channel, with her posterior extremities and her hind legs awkwardly placed under her; quite frequently she is found lying on her belly, with a hind leg on each side, and the hocks fully flexed; or if lying in the stall, it will be found that the hind leg she is lying on is wrongly placed, being fully extended parallel with the body, and the entire weight of the body resting on it; this happens because, as the cow loses power, she also becomes unable to put the under leg in the natural position, with the foot appearing under the belly in front of the udder. She may have been lying thus for some hours, before being seen.

Both these positions produce injuries to either the nerves or muscles of the hind legs (one or both) which cause the animal to remain down after the milk fever is cured.

In my opinion most cases of decubitus after milk fever are caused in the above fashion.

Broken bones and dislocated joints result from the want of care in turning and handling the animal. Whatever the cause, the cow either will not try, or has not the power, to raise herself into the standing position, although she will be eating, ruminating, and even milking quite well, and is not suffering from any fever. Some turn themselves from side to side, when they desire to do so; others prefer to be on one particular side, and if put on the opposite side, very soon put themselves on to the other, and will not voluntarily move off that side. This preference appears to be caused by pain suffered when on one side, as evidenced by restlessness and blowing. I look on this as an unfavourable symptom.

The symptoms of the various causes mentioned, are those usually attributed to them, and need not be mentioned here.

To prevent these cases, the first thing to do is to get the animal out of the dung channel and on to its side, if the legs have been both doubled up under it especially, so as to take the pressure and strain off them. Then fill the channel with wood up to the level of the floor of the stall, and if possible fix it, so that at the back a piece projects some inches above the level, because this prevents the cow from getting back too far, as the projection catches her quarters.

After treating the primary disease, have the animal propped up as much as possible on her brisket, but be sure that the foot at least of the under hind leg is visible through below the belly. It is better to have the cow lying rather to the flat side, than to have the under hind leg in a wrong position. At the same time, notice that each fore leg is on its side of the brisket, otherwise it is difficult to keep the cow upright. Tie the cow with a rope round the horns or a halter on the head, to the opposite side of the trevis to the one she is lying on; if she is lying on her left side, tie to the right side of the trevis, and *vice versa*. Of course, the chain should be removed from her neck. This procedure helps greatly to keep the cow in a natural position. Should she turn herself before she can place her legs properly, see that this is done for her, and the head rope changed also. If she does not turn herself in a reasonable time, she ought to be turned, and before doing so, a piece of rope should be fixed to the pastern of the free hind leg, and put as far under her as possible, so that it can be grasped after she has been put over, and the leg, which is now the under one, pulled through below the belly until the foot or more is visible. Some cows fight strongly against being turned; others are heavy, and there may be deficient man power about the place. I find that a rope pulled under her from the front, one end of which is tied to the free leg and then drawn tight, drawing the leg close into the belly and keeping it there, preventing the cow using it as a lever against being turned, and, when the free end is passed over the cow's back, and is pulled on by one or two men on the opposite side, makes it much easier to turn refractory or heavy cows. The rope is then ready to pull the leg into its proper position.

In those cases it is always good policy to be guarded in giving an opinion about the probable duration and termination of the condition, although some of them can be looked on quite hopefully, especially those due to deferred recovery from milk fever, and the temperament of the animal, and a majority of the cases of nervous or muscular injury, where only one hind leg is affected.

The treatment of these cases is carried out on the general principles applicable to each case. Where one is convinced that the spine is affected, or of the presence of broken bones or dislocated joints, I think immediate slaughter the best policy.

In other cases, the animal should be turned from side to side four times a day, or oftener, and after being turned, the side she has been lying on, and more especially the hind leg, should be well rubbed with a stiff brush. The turning can be done twice daily at milking time, when one side of the udder can be emptied before turning, and the other side after this is done. I do not like to put a mustard plaster on the back at once; if it fails to make the cow rise it makes the back tender, and in some cases, I believe, tends to keep her down. During the first two or three days it rarely happens that any injury is done to the skin, if the bedding is properly looked after, but after three days the skin is very liable to become abraded and sore, because the bedding is difficult to keep in position, and the animal is lying on the bare cement or bricks most of the time. The best preventative of these bed sores that I know, is to cover the whole of the surface of the stall with sods, cut fairly long and not too thick. The older the turf the better, as it stands longer.

Two layers laid crosswise form the best bed, and a cow can lie on it for a long time without injury, and where necessary renewal can be easily and quickly carried out. Not only does this prevent bed sores, but it gives a cow confidence to try to rise, because, where before her feet were slipping on the floor, she now feels that they are held and firm. In obstinate cases it sometimes answers the purpose to raise the cow with slings. In a few cases once is enough to do this, as the cow afterwards rises on her own accord. In other cases recourse has to be had to this once or twice daily for several days before success follows, while in others the animal shows less inclination to try at each subsequent effort, and these cases are not worth fighting with. However, I have known a cow make absolutely no attempt to stand the first time she was slung, yet, after being let down, she rose without any help in a very short time.

Where swollen or tender muscles can be detected, a rub two or three times daily with a stimulating liniment does good, but fomentations are bad practice, because they soften the skin, and hasten the advent of bed sores.

When the skin shows any sign of chafing, the parts can be dressed with methylated spirit, astringent lotions, or dusting powders.

The best treatment for No. 2 is to make them as comfortable as possible on a good level bed of turf, turn them frequently, groom them well, and never ask them to rise for two or three days. Internally, salines, nux vomica, and bitters are useful.

Discussion.

Dr. J. R. Greig said that this condition was one which had given rise to a certain amount of controversy. As Mr. Wilson had mentioned, there were several conditions included under the general term "decubitus," and he thought he had mentioned or referred to all of them. He himself had been very much interested in the psychology of the cow, and particularly in that type of fear inhibition which caused a cow to remain recumbent though she had the ability to rise, until the secondary conditions such as bed sores had had time to develop. In these cases, if bed sores could be avoided, as a rule it was only a matter of time before the cow would rise to her feet.

He thought it was possible in certain of those dull, almost mental cases, in which milk secretion was inhibited, and where the bowels were static, that hypocalcæmia was still present, and in such he suggested that calcium gluconate might be injected.

Mr. A. R. C. Bowie stated that he had found, in more cases than one, a condition in which the interscapular region was exceedingly tender and showed on palpation an intense amount of pain, so much so that he believed some practitioners had given up putting mustard along the spine except well behind this part. He would like to ask Mr. Wilson if he had met with many cases which pointed to kidney derangement as the cause of the decubitus—passage of blood-stained urine, pain in the lumbar region, etc. He had had several such cases.

Mr. W. Wallace Peggie thanked Mr. Wilson for a very practical and interesting paper, especially so to the practitioner. He also had trouble with the treatment of decubitus in the cow after milk fever. The older treatment—the use of stimulants—was empirical only, and frequently failed. Mr. Wilson had not mentioned those cases which went down before and after calving in the absence of milk fever. They occasionally occurred, even in bullocks. He thought perhaps they might be due to a disturbance of the calcium balance, and had injected calcium gluconate, but without much success. He sometimes felt they were more of the nature of spinal meningitis. Breathing was usually irregular or distressed, temperature might be elevated, and they did not constitute very hopeful cases. Some cases occurring after parturition might be due to injuries at calving, but the possibility of thrombi in or near the larger nerve centres, as well as in the large iliac vessels, could not be dismissed in all cases.

He had given up the use of mustard; he thought it was of very little value. He was also opposed to the employment of slings, since he had found them practically useless for dairy cows, in which the spine was not rigid as in the horse, and the weight and shape of whose abdominal contents did not lead to easy adjustment of the slings. He agreed that the psychology of the cow was of great importance—he had seen cases lie for a week and appear to be making no progress, and then one morning they would be found standing peacefully chewing the cud.

Dr. Greig mentioned that in the few cases in which the Animal Diseases Research Association had had opportunity to examine the blood of post-parturient decubitus cases where no milk fever was present, they had found the calcium content normal.

Professor R. G. Linton referred to the old-fashioned method of inducing cows to rise by bringing in a strange collie dog to the byre. Cases which remained recumbent for psychological reasons might still be induced to rise in this way.

Regarding calcium requirements during pregnancy and lactation, he wondered whether the amount of calcium which was being provided for the ossification of fœtal bone during late pregnancy was not much greater than that required for the initiation of lactation. He thought the drain of calcium to the colostrum could not be so great as to the fœtus previously.

Dr. Greig rose to mention that, whereas the drain of calcium to the fœtus was a constant though gradually increasing drain, the drain to supply the calcium for the colostrum was very sudden.

Mr. J. P. Walker said that he also agreed that the temperament of the cow was very important. Mr. Wilson had said that during treatment he advocated making the cow comfortable; he (Mr. Walker) thought it was often better to make her uncomfortable, so that she might be induced to rise to escape the discomfort. He had heard that the skin of a newly-killed sheep, placed fleshy side downwards over the loins, was often a very effective way of inducing a cow to rise. It acted by stimulating circulation locally. Had Mr. Wilson any experience of its use? He had had a case where a cow lay for nine days—the calf having been removed from her so soon as it was dry. As soon as the calf was returned to her she got up at once.

Mr. Anderson said he also wished to thank Mr. Wilson for a very interesting paper. He found that in the absence of injury most cases turned out to be due to temperamental causes. He advocated taking precautions to avoid injury, bed sores, etc., and otherwise keeping the cow comfortable and leaving her to get up when she wished. He quite agreed that slinging was usually most unsatisfactory.

Mr. W. Nairn commented that he sympathised with Mr. Wilson. He had chosen a subject which was many-sided, and one where many factors were involved. He thought some were undoubtedly cases of prolonged milk fever, especially when the udder was empty and where peristalsis was absent. Many others were due to neglect, the treatment being applied too late. He, like Mr. Peggie, had used calcium gluconate and found it very disappointing. In a few cases he found that if tympany of the rumen was present and the cow was merely turned over on to the other side, she would rise almost at once. He agreed that fractures did occur at times, but in more cases the injury was a laceration of the muscles on the inside of the thigh through slipping when endeavouring to rise on a previous occasion.

He had not found slings to be of much use in these cases.

The Reply.

Mr. Wilson said he knew he had chosen a big subject; the discussion had been somewhat diffuse, and he could not hope to cover it all in his reply. He thought cases of deferred milk fever were fairly common and had found

A Communication on General Anæsthesia in the Horse.*

By C. B. Davidson, M.R.C.V.S., Royal (Dick) Veterinary College.

The objects of this paper are to place before you methods employed at this College for the preparation of horses prior to operation, and the mode of induction of general anæsthesia.

Before operation horses are starved completely for 24 to 48 hours; mashes are given prior to this if time permits. The length of fast depends on the operation that is to be performed. Water is also withheld the day prior to operation. Subjects in which there is to be considerable surgical interference with muscular tissue are given 10 ounces of glucose per day for two or three days previously. This glucose is given in water and mash spread over the day. This becomes stored in the liver and can be used then as the body requires it. It has been found that this wards off the risk of surgical shock and the liability to toxæmia following anæsthesia. Foot cases, *e.g.*, canker, though much tissue may be disturbed, do not show the same tendency to surgical shock as cases where muscular tissue is disturbed.

Every horse receives a preliminary narcotic. The drugs used are sulphonal and chloral hydrate.

* Presented to the Annual Meeting of the Scottish Metropolitan Division, N.V.M.A., held at Edinburgh on January 28th, 1931.

Sulphonal is given to those cases which we think will show resentment to the passage of the stomach tube, or are vicious or bad to handle. The dose used is ten drachms to the average hunter and in proportion for other horses. The drug is given in a mash 1½ to 2 hours before operation. It acts slowly and is very erratic in its action: some horses give a good response, while others show no effect. Effects last longer than chloral, even up to two days.

Chloral hydrate—freely diluted—is always given by stomach tube. It has been found that when the drug is given in a large quantity of water effects are sooner noted. For a hunter, eight to ten drachms are given in about two gallons of lukewarm water. Two ounces suffice for a heavy draught horse in good condition. Other horses receive doses in proportion. It is seldom that less than two gallons of water are given. After the stomach tube has been passed and the drug pumped over, the tube is washed out *in situ* with a little clean water. This is done to prevent a unilateral nasal discharge which frequently appears about two days after if the washing is omitted. (If the horse will allow the insertion of the first finger to its fullest extent up the nostril little difficulty will be experienced in passing the tube.) Fifteen minutes is the average time chloral hydrate, given thus, takes to show effects, namely, loss of muscular control. Some horses will respond to the above doses in five minutes, even to the extent of falling. Up to half-an-hour may be required by other horses, but ten to 15 minutes is the average.

(It has been recorded that chloral hydrate given twice, with a very short interval between the doses, is frequently fatal. Reactions seen, and *post-mortem* findings, are similar to those seen in cases of anaphylaxis. A fatal case occurred in College. The interval between doses in this case was 24 hours. After the second dose the horse was put on the operating table and after only one ounce of chloroform had been administered breathing stopped without warning. Artificial respiration, applied immediately, was of no avail as the case was one in which the heart had stopped at the same time. *Post-mortem* findings resembled those seen after surgical shock.)

The horse is then cast or secured on the table.

The nostrils are anointed with vaseline. Cox's muzzle is then adjusted and a folded half rug placed under it. This rug envelops the muzzle, prevents waste of volatilised chloroform and gives a more concentrated chloroform vapour, than without the rug.

The initial dose of four drachms of chloroform is poured over the sponge, which is then inserted into the muzzle and the whole covered with the rug. This dose volatilises in two to three minutes. The difference in time is accounted for by the fact that some horses hold their breath a little at this time, while others breathe convulsively. Seldom are more than three minutes required. The administration of a second four-drachm dose depends on the subject. No further dose of four drachms would be required for a pony. A small hunter may require two four-drachm doses, a vanner three, and a heavy draught horse in good condition probably four. These extra four-drachm doses are allowed from two to four or even five minutes to volatilise, according to the animal and the quality of its breathing. When the necessary number of four-drachm doses have been given the dose is reduced to two drachms, this amount taking

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that calcium gluconate, in large doses, did do good in some. He called to mind one case in which he had inflated the udder at first but the cow remained recumbent. He returned and gave two tubes of calcium gluconate and she rose without trouble subsequently. He had never noticed pain over the withers or between the scapulæ, nor had he encountered blood-stained urine in these cases at all frequently. He thought he would always suspect injury, possibly by a careless byreman, in such instances.

He knew the condition which might be termed "decubitus without milk fever," to which reference had been made, where a cow lay for days. He often thought such cases due to nervous exhaustion following parturition, and found that when the cow regained her normal nerve tone she would rise again without difficulty.

Regarding slinging, he was convinced there were cases which benefitted by being slung once, but he would never allow a cow to hang in the slings; the sternum was too short and the abdomen too long and flaccid. If raised in slings some cows immediately found their feet and stood. If they did not, he let them down again on to a good bed.

Sheep skins produced heat but were not desirable because of the decomposition and abominable smell also produced. He had seen cases, where owners had used them, where the hair came off the back and lumbar region and never grew again.

Collie dogs were sometimes used and sometimes did good in causing the cow to make a more supreme endeavour to rise. Cows were extraordinary psychological subjects as nearly everyone had agreed, but he found that with proper nursing and attention and confidence in their foothold, such as was most admirably provided by sods of old turf, they would sooner or later try to regain their feet themselves, and would eventually do so. In conclusion, he would like to thank the members for the way in which they had received his paper.

on the average two minutes to volatilise. After a dose of two drachms has been allowed to act for two minutes the sponge is taken out and sniffed. This gives useful information as to how fast the horse is taking the chloroform and whether the two minutes between doses should be lengthened, or shortened, to ensure careful anæsthesia. These doses may seem small as compared with those obtaining in the field, but the method ensures an even and safe stream of chloroform vapour. Records of more than 30 cases can be seen by anyone interested. By this method eight ounces of chloroform will keep the average horse under good surgical anæsthesia for one hour.

The depth of anæsthesia is assessed by the state of the tail—whether tense or lax. Another guide is the speed of the anal reflex to the flick of the finger. Blinders are used for safety in casting, thus making it difficult to use the eye reflexes.

Danger signs are abnormal respirations, twitchings of muscle groups, muscular spasms or racing movements.

The preliminary narcotic gives greater ease in handling, especially horses that are to be put on the table. Less power is needed in casting in the limited space in the theatre. Then again, small doses of chloroform are necessary, thus reducing the risk of trouble during and after the operation, and saving chloroform. The stage of excitement is materially reduced and occasionally not seen at all. In some horses, however, chloral hydrate has such a profound effect that it removes the reflexes, thus depriving the anæsthetist of much valuable information.

Discussion.

Professor W. M. Mitchell said he would like it to be understood that when teaching students it was desirable to impress upon each the necessity for keeping constant attention upon the subject. By giving small doses of chloroform it became essential for the anæsthetist to watch his animal all the time, and it also lessened the risk of heart failure which sometimes followed a large initial dose. If the operator was satisfied that the anæsthesia was under constant supervision, he could devote himself to the details of the operation entirely. He would also like to mention that the horse was one of the best of their subjects for chloroform anæsthesia; possibly the very best.

Major Grahame Williamson observed that he had had very good results with chloral hydrate alone, and had never noticed any unilateral nasal discharge. He also asked for further information regarding the amount of chloroform required. He thought he understood Mr. Davidson to say eight ounces per hour, and regarded this as an excessive amount.

The President (Mr. W. Nairn) said he had seen unilateral nasal discharge following the administration of chloral, and always considered it due to the use of the stomach tube.

Mr. P. Wilson asked for the experiences of others in giving chloroform to cows. He found that following and during its administration there was always excessive salivation, and not infrequently regurgitation of saliva. He wondered whether there was any method of preventing this and had often been tempted to give a hypodermic injection of atropine. So bad was the salivation in some cases that the sponge might be wringing wet, and the cow might even get suffocated by her own saliva, unless precautions were taken to keep the head at a low level so that it might escape.

Mr. A. L. Robertson stated that he had used an inhaler and found it very satisfactory. Regarding chloral and water he found that when the solution was dilute he did not get satisfactory results. A dilution of 1 oz. in two gallons was liable to be irregular in its action. He gave 1 oz. in half a gallon and found he could depend upon the action much better. He also had had considerable trouble from excessive salivation when administering chloroform to cattle.

Professor D. Imrie said he had used a muzzle of his own design for many years. Most of the members, he felt sure, were familiar with its principles and construction. It allowed for a stream of air mixing with chloroform vapour in a mixing chamber. The mixture came through an inspiratory valve when the horse inspired, an expiratory valve being meanwhile shut. During expiration, the expiratory valve opened to allow the exhausted air to pass out without wastage of the chloroform, while the inspiratory valve from the mixing chamber closed. For an ordinary castration he found that 6 drachms to 1 oz. were sufficient.

Regarding stomach tubes, he found it was not always necessary to use one. If a horse was thirsty he would often drink the chloral solution himself.

He had not recently used chloroform for cattle; he preferred giving chloral instead, but he could not call to mind such trouble as Mr. Wilson mentioned when he used to use it.

Professor Mitchell observed that he also found that better results were obtained by giving chloral in greater concentration, though he had only recently done this.

Mr. Davidson, in reply, said that, regarding unilateral nasal discharges, they had had a series of cases following the administration of chloral by the stomach tube, but since washing out the tube with clean water before withdrawing it they had not seen it. It might be that during removal of the tube a small amount of chloral leaked out when the stomach end was passing down the nasal cavity, and this set up a local inflammation and discharge.

With reference to salivation in the cow, the hypodermic injection of gr. ss. of atropine sulphate might be satisfactory and would be worth trying.

Entropion in the Dog and its Treatment by External Canthotomy.*

By Professor W. M. Mitchell, M.B., Ch.B., B.Sc. (Edin.), M.R.C.V.S., Royal (Dick) Veterinary College.

There are two common conditions met with in dogs which cause a rolling inward of the eyelids which I have found do not respond to the simple operation of removal of an elliptical piece of skin.

1.—Blepharophimosis.

2.—Blepharospasm.

In blepharophimosis the entropion is due to contraction of the skin at the external canthus of the eye and at first sight the palpebral fissure appears abnormally small. On closer examination a vertical fold of skin is seen, bridging over the external canthus from the upper to the lower eyelid, which can be obliterated by pressing the skin laterally, when the normal external canthus is disclosed. This abnormal fold favours the production of entropion. Such cases as I have seen have been in young dogs and are apparently congenital.

Blepharospasm, or spasm of the orbicularis, manifests itself by squeezing together lightly of the eyelids. It is,

* Presented at the Annual Meeting of the Scottish Metropolitan Division, N.V.M.A., held at Edinburgh, on January 28th, 1931.

of course, a common sign accompanying inflammatory conditions of the eye, but when these are relieved the spasm disappears. In some cases, however, entropion results and there is thus produced increased irritation of the eye, so that recovery of the original condition is made very difficult or impossible without rectifying first the entropion.

There are other cases where marked spasm of the orbicular muscle with entropion occurs somewhat suddenly in adult dogs, affecting both eyes, apparently idiopathically. Such dogs have a rolling inwards of the upper and lower eyelids of both eyes, there sometimes being over ¼ in. of skin of the eyelids applied directly to the eyeball, so that life becomes miserable from the discomfort.

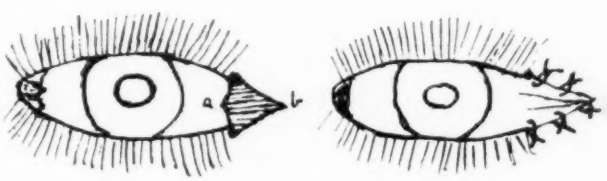
Operation of External Canthotomy.

It is preferable to give the animal a general anæsthetic, as local anæsthesia by infiltration leaves the field of operation too œdematous.

The skin around the external canthus of the eye should be shaved the day before operation, and at the time of operation this skin around the external canthus should be cleaned with spirit and the conjunctival sac flushed with a non-irritating antiseptic, *e.g.*, acriflavine 1-1,000.

An assistant then draws the skin of the external canthus towards the inner canthus with his fingers or by means of a pair of peritoneal tissue forceps applied one to each palpebral border about ¼ in. from the inner canthus, at the same time opening the fissure as widely as possible at the external commissure.

The operator, with a pair of blunt-pointed, straight scissors, introduces one blade behind the fold thus formed as far as possible and divides the fold in the line of the palpebral fissure. This leaves a rhomboidal wound, two edges lying in the skin and two in the conjunctiva.



Without doing any further damage to the conjunctiva, all tissue is cut through in the wound thus formed until the bone at the external border of the orbit is reached.

The scissors can be used for this, though I prefer to use a small scalpel.

Using a fine, curved, bayonet-pointed needle, armed with fine silk-worm gut, the severed conjunctiva at the central point (*a*) is approximated to the skin at point (*b*) (see diagrams). One or two sutures are introduced, uniting skin and conjunctiva through the upper and lower edges of the wound, tying the ends as "grannies" so that there are no ends projecting into the conjunctival sac.

The subsequent dressing is merely to instil suitable antiseptic eye drops once or twice daily into the conjunctival sac, removing the sutures in about a week's time.

It is advisable to put an Elizabethan collar on the dog to prevent it rubbing at the eyes until the sutures are taken out.

A Simple Injection Treatment for Prolapse of the Rectum.*

By W. M. Mitchell, Royal (Dick) Veterinary College.

The method is one which has been used with great success in babies, and in the few cases in which I have had opportunity to apply it in the dog it has given good results, but I think a wider application of it in animals is required before judgment can be pronounced on its usefulness; this is my reason for bringing it to your notice.

In the dog, I first of all give a hypodermic injection of morphia, which can be repeated later in order to maintain a period of complete rest and thus prevent straining. Once the dog is narcotised the prolapsed portion of bowel is returned within the anus, compressing the prolapse first of all with a large moist gauze compress if it is very much congested.

The skin on each side of the anus is then rendered as sterile as possible by spirit and tinct. of iodine and with the finger in the rectum an ordinary 1½ in. Record hypodermic needle is introduced at right angles to the skin, about ¼ in. from one side of the anus, and then pushed forwards its full length in the peri-rectal tissue, the finger in the rectum guarding it from puncture by the needle. From 1-2 c.c. of absolute alcohol is injected into the peri-rectal connective tissue, varying the amount with the size of the dog.

The injection is repeated on the other side of the rectum in the same way.

I need not say that the irritation leading to the prolapse in the first instance will still require attention.

Discussion.

Mr. A. Linton Robertson asked whether the injection treatment had any application to animals other than the dog. Would it be satisfactory, for example, in young bulls being heavily fed for sale, and, if so, how much absolute alcohol would be required?

Professor Mitchell replied that he had had no experience of the method in cattle. The method might be useful if straining was not severe. The amount would not be much more than was used for dogs, injected at four different places. It acted by inducing a fibrosis which resulted in the formation of what was virtually a ligament.

* Presented at the Annual Meeting of the Scottish Metropolitan Division, N.V.M.A., held at Edinburgh, on January 28th, 1931.

Remarks on the Operation.

The relief afforded seems to be due to division of the circular fibres of the orbicularis, as in some cases, especially where blepharospasm causes the entropion, the sutures between conjunctiva and skin have given way early and the wound has had to granulate up.

The disfigurement looks rather alarming immediately after the operation, with the palpebral fissure increased by about ½ in. and this part gaping through retraction of the severed orbicularis muscle, but in a few weeks' time this gaping portion disappears, a mere slit remaining, which does not attract attention.

The Veterinary Record.

April 11th, 1931.

The Royal College Annual Dinner.

The Annual Dinner of the R.C.V.S. has been fixed for Thursday, July 2nd, 1931, at King Edward VII Rooms, Hotel Victoria. Amongst the distinguished guests who have promised to attend are H.R.H. the Duke of Gloucester, the Minister of Agriculture, the Lord Mayor of London and the two Sheriffs of the City, the President of the Royal Society, the President of the Royal College of Surgeons (Lord Moynihan), Lord Daresbury, Sir G. Courthope, M.P., Sir Frederick Green, Sir Charles Howell Thomas, and others.

The occasion promises therefore to be of more than usual interest and importance, and we think it well to give this early notice of it, so that as many members as possible may arrange to be present.

There are several events which appropriately call for commemoration this year. One hundred years ago William Youatt published his famous book on the Horse, which found its way into every country gentleman's library. In 1831 Youatt also gave his first course of Lectures at the University of London (now University College) in Gower Street, a venture which gave a great impetus to veterinary education. In this same year Professor Coleman, the Principal of the Royal Veterinary College, was elected F.R.S. —the first veterinary surgeon, and it would seem the last, to be so honoured—at any rate *qua* veterinary surgeon.

It was also in 1831 that William Percivall completed his Lectures on the Anatomy of the Horse, a work which was the classical text-book on the subject for half a century. Percivall's father, John Percivall, to whom he owed most of the practical information with which his works abound, died in 1831, while holding office as President of the Veterinary Medical Society. He was a great man, loved and honoured by the profession, and one of its strongest pillars. Here are a number of centenaries to be celebrated!

Perhaps most important of all events to be commemorated this year is the fiftieth anniversary of the passing of the Veterinary Surgeons Act, 1881, which first set the profession upon a legal basis. The Royal Charter of 1844 had given recognition to the profession, accompanied by certain privileges, but there was no restriction on the title of Veterinary Surgeon, and no provision for registration, so that it had little effect in protecting the public against "quacks." This protection was provided by the Act of 1881, and we can therefore look upon this year as in some sort a veterinary jubilee.

The annual banquet in July presents us with an exceptionally fine opportunity of celebrating this jubilee, and we hope that members will attend in large numbers. If any additional reason needs to be advanced, let us point out that it will be one way of showing our respect for Sir John M'Fadyean, who for the third time in his life has taken upon his shoulders the heavy duties of the Presidency. This year he reaches the venerable age of 78, and the 55th anniversary of his graduation as M.R.C.V.S. Sir John has brought much honour upon the profession; let us rally to his banquet to do honour to him.

Book July 2nd, therefore, both for yourself and your guests.

Clinical and Case Reports.

A Case of Generalised Osteo-arthritis in the Horse.*

I.—Clinical History.

By Major Grahame Williamson, R.A.V.C.

If any justification is needed for bringing this case to your notice it was, I am sure, given at that meeting of this Branch of the "National" which was held at Blairgowrie almost two years ago, when Professor Mitchell showed us that interesting collection of osteo-arthritic lesions which he had collected. He suggested then, as you will remember, that if we took the trouble to make more thorough our *post-mortem* examinations we would be able to obtain just such specimens as he had shown us. There is nothing extraordinary in the clinical history of this case which I am about to report, but you will agree with me, I think, that the *post-mortem* findings are suggestive.

Unfortunately, as so often happens, the early history of the horse cannot be traced with any exactitude, but that for the last five-and-a-half years can be given in detail.

The subject was a weight-carrying hunter, foaled in Ireland in 1917, and bought by the last owner as an eight-year-old in April, 1925. At that date it was examined by a veterinary surgeon and passed sound. The horse was, however, described by him as "showing effects of hard work but likely to last for many years."

He was hunted regularly for the following seasons up to that of 1929-30, when he showed himself to be a free and big jumper, and gave great satisfaction to the owner.

At the first day's hunting last season he was moving as well as usual over a timber country when he put his foot in a drain and came down. He appeared to be none the worse for this at the time and finished the day. Three days later he was hacked out to a meet, but was sent back as it was noted that he was lame behind. The next day he was seen by a veterinary surgeon, when it was reported that there was a "wasting of the muscle over the quarter." Two weeks later he was lame off fore and

* Case presented at the Annual Meeting of the Scottish Metropolitan Division, N.V.M.A., at Edinburgh, on January 28th, 1931.

was blistered lightly on that shoulder and on the off quarter. One month after this he was again hunted and came in slightly lame on the off fore. After resting for a week he was hunted once more, but at the end of the day he was very lame on the same leg. The veterinary surgeon diagnosed ringbone and pinfired the pastern. The operation was followed by two months' complete rest and he was turned out to grass last May.

At this time there was a noticeable lameness of the off fore, where a considerable thickening over the seat of firing had formed. Much of this thickening seemed to be of a fibrous nature. Apart from this local fibrous thickening and exostosis the limbs were clean and their movements free and apparently normal. The foot was slightly contracted. A modified form of Smith's operation of hoof grooving was then carried out, but there was no immediate improvement in the lameness. It was noticed, however, that after a rainfall or as long as the ground was wet or sodden the lameness disappeared. From the end of June this condition mainly prevailed and when brought up from grass in the middle of September there was some hope that recovery was possible. A fortnight before being brought in a certain slackness in the movement of the hind legs had been noticed, but it was so slight that little attention had been paid to it.

Immediately on stabling, the horse was fasted for two days and the chenopodium treatment for entozoa given. When fully recovered from this, he was taken out for exercise and it was then found that there was grave inco-ordination of the movements of the hind limbs, so that there was awkward progression, difficulty in turning and inability to back. The feet were dragged, the legs often crossed and there was sometimes danger of collapse. A course of strychnine was prescribed and slow exercise continued. After a fortnight of this the condition had improved, but as the lameness in the off fore had returned, destruction was advised and carried out. There seems at no time to have been suspicion of respiratory trouble.

The horse was a " good doer " and had always been in excellent condition. Each summer for the last five years he had been turned out to grass. To sum up—the horse appeared to have been suffering from ringbone for nine months and had received the orthodox treatment. A fortnight before destruction signs of posterior paraplegia had developed.

Professor Mitchell, who made the *post-mortem* examination, will now tell you what was found.

2.—Post-Mortem Examination.

By Professor W. M. Mitchell.

General :

Nothing of note was found in the mouth cavity, salivary glands (nasal cavities were not examined), pharynx, larynx (no atrophy of laryngeal muscles), thyroid, pleura, lungs, trachea and bronchial lymph glands. The mediastinal glands were somewhat hyperplastic.

The pericardium was normal, but the heart appeared to be large for the size of the animal, particularly the right side. The right atrium contained a number of calcareous plaques, a condition I have seen several times in horses suffering from osteo-arthritis; otherwise, the heart was normal.

Œsophagus and diaphragm were normal.

The only feature noticeable in the alimentary canal, after opening it throughout, was the presence of a number of small pin-point-like nodules in the mucous membrane of the first part of the large colon which one associates with the attachment of strongyles, but no worms were visible in the contents of the canal.

The abdominal mesenteric glands were slightly hyperplastic.

The cranial mesenteric artery was slightly thickened from old-standing arteritis, probably of verminous origin.

The liver showed some peri-hepatitis on the diaphragmatic surface and a few small fibrous nodules in its substance.

Pancreas, adrenals, kidneys and bladder showed no obvious naked-eye change.

Nervous System.

The only parts examined were the spinal cord, cauda equina and the sciatic nerves.

Beyond some slight appearance of petechial hæmorrhages under the periosteum covering the dorsal surface of the bodies of the fourth and fifth lumbar vertebræ, and a little œdema around the cord in proximity to this region, nothing was found during the *post-mortem* examination.

Examination of Bones and Joints.

The horse showed signs of a general osteo-arthritis with marked lesions in many joints, and I have here to show you a representative selection from various parts of the body. I would ask you to keep in mind that the only definite clinical lesion was a ringbone in the off fore foot.

Phalangeal Bones and Sesamoids of the Third Phalanges. Fore and Hind Limbs. *(Dry specimens, except Sesamoid third phalanx of the off fore, which is a wet specimen.)*

First Phalanges.—Exostoses on posterior surfaces.

Second Phalanges.—There is a slight suspicion of an exostosis on the anterior surface of the off fore leg, but unless one had known of the presence of the clinical enlargement at the coronet in this foot one would almost say that all the phalanges were the same.

Third Phalanges.—Pedal ostitis both fore, hind limbs might be called normal, but I admit it is difficult to say where the line between normal and abnormal can be drawn. No obvious pathological change was met with in any of the articulations from the fetlock downwards.

Sesamoids Third Phalanx (Navicular). In both fore limbs there is very definite disease affecting the flexor or lower surface, well seen in the off fore, which is a wet specimen, with corresponding change in the flexor tendon which is attached.

Elbow Joints. *(Wet specimens.)*

Near Fore.—Fine grooving and ridging of the articular cartilage on the radius and humerus, and in the centre of the concavity for the capitulum of the humerus on the proximal end of the radius a small fibrous tag.

Off Fore.—Grooving and ridging of the articular cartilage to a less extent than in the near fore.

Hip Joints. *(Wet specimens of Acetabula only kept).*

Left.—On opening this joint about 3 ozs. of blood-stained synovia escaped. The synovial membrane in the fossa acetabuli is greatly hypertrophied and deeply congested and has led to enlargement and deepening of the fossa.

Right.—Shows a smooth synovial membrane, not congested, and I suspect that this joint has gone through the more active process seen in the left joint and is an example of nature's effort at cure in the shape of new bone filling up the fossa acetabuli.

Thoracic Vertebræ 1-8 and Proximal Extremities of Left Ribs 2-8 (*Dry specimens*).

The whole of the thoracic region showed changes such as are represented by the specimens exhibited.

The articulations between the ribs and vertebral column show the result of long-standing osteo-arthritis. Lipping of many of the articular surfaces on the vertebræ for both the tubercles and heads of the ribs is considerable, and on the ribs and the vertebræ of many of the joints, just beyond the articulations, are small periosteal osteophytes.

Proximal End of an Asternal Rib. (*Wet specimen.*)

Shows the distinctive chronic changes of the articular cartilage in osteo-arthritis with lipping of the joint and active synovitis.

Lumbar Vertebræ and Sacrum. (*Wet specimen.*)

Similar chronic osteo-arthritic changes are seen in the articulations between the articular areas on the traverse processes as between ribs and vertebræ.

Discussion.

The President (Mr. W. Nairn) asked whether, in view of Professor Mitchell's hypothesis at Blairgowrie, there had been any symptoms of shivering in this case. He understood that osteo-arthritis and shivering were associated. He also wondered whether there could have been any gross errors in feeding, in view of the same hypothesis.

Mr. W. C. Miller asked whether Professor Mitchell could say whether the joint lesions were aseptic or not. It was obviously not possible to treat such widely distributed inflammatory changes in joints by counter irritant methods, and he wondered whether there was not some suggestion that, by correcting the calcium phosphorus balance, or the thyroid-parathyroid mechanism or even perhaps the activity of the thymus, steps might not be taken to ameliorate even considerable osteo-arthritic conditions before they became too advanced.

Professor Mitchell (in reply) said that, in his opinion, shivering was only one of the many possible local manifestations of osteo-arthritis, which he now looked upon as a general disease. This horse was not a shiverer. Dr. Hare had carried out some work on the question of the flora in osteo-arthritic joints with more or less negative results, but he had not made any bacteriological investigation himself. From the immense amount of work done on analogous conditions in the human being it seemed very unlikely that there was anything in the nature of a specific infection in these chronic arthritic conditions.

He thought that the administration of a good supply of vitamin D was more important that any attempt to correct calcium or phosphorus unbalance. Mellanby had shown experimentally in dogs that the calcium intake could be brought to a very low level, but so long as there was an abundance of vitamin D in the diet perfect calcification was got in the teeth. He thought that Professor Linton could add something about diet and vitamins.

Major Grahame Williamson mentioned that this particular horse had been fed in England, Ireland and Scotland, and that it had spent the summer out at grass, so that it was difficult to believe that it had been on a deficient diet.

Professor Linton said that it was possible that there was more avitaminosis among horses than was usually realised. The methods adopted for hay harvesting were probably to blame. Oats, as fed to horses, were deficient in vitamins, and hay lost nearly all of its vitamin A during making. Cod-liver oil would increase growth rate and correct some of this avitaminosis, and the addition of some substance rich in vitamin B would probably give a diet balanced so far as vitamins were concerned.

Recent work in making grass cakes, which had been undertaken in Austria some years ago and more recently at Jealott's Hill, might prove to be exceedingly valuable in this direction.

The President said he thought most practitioners would agree that the vitamin content of the food was of greater importance than the mineral balance.

An Experience when Castrating a Cryptorchid.*

By A. Linton Robertson, M.R.C.V.S., Arbroath.

In the spring of 1925 I was asked to castrate a yearling Clydesdale colt. On examination I found that only one testicle had descended into the scrotum; accordingly, I left the animal until the autumn. Further examination in the autumn revealed the same state of affairs; I therefore removed the one testicle and left the colt till the next year, hoping that by that time the other testicle would have descended.

As there was no further development by early summer, except a rupture of the near side, about the size of an apple, I decided to perform the ordinary operation for the castration of pigs, by the inguinal method. The unfortunate thing was that I had forgotten to make a note of the side from which I had removed the testicle.

After the colt had been fasted for about twenty-four hours, I chloroformed him in the standing position, using Imrie's inhaler. When I had him on his back and secured in the usual position, I found that the scar of the previous operation was exactly in the median line. I then thought that the rupture was possibly the result of the castration, so I decided to operate on the off-side.

After sterilising my hands, arms, and the part, I cut through the skin, etc., and came on a mass of tissue, about the size of a walnut, in the inguinal canal. At first I thought this was the missing testicle, but on further examination I found that it was the end of the spermatic cord, upon which I had operated the previous spring.

I was in a dilemma as to whether to suture the wound and commence again on the other side or to continue the operation of the off-side. I thought if I were to start operating on the near side the owner would know that I had made a mistake and if the colt died I might have been accused of carelessness, so I decided to continue the operation.

I experienced little difficulty in getting into the abdominal cavity and soon found the missing testicle. It was about the size of a football and just as hard. As it was impossible to withdraw it I decided to ligature the cord and leave the testicle. After gentle massage and traction I managed to get sufficient of the cord through the canal to enable me to apply two ligatures about two inches apart. I then severed the cord, with a chain écraseur, between the ligatures, and allowed the ends to drop back into the abdominal cavity.

I then put my hand back into the abdominal cavity and reduced the rupture of the near side, and finished the

* Case presented at the Annual Meeting of the Scottish Metropolitan Division, N.V.M.A., at Edinburgh, on January 28th, 1931.

operation by inserting a few interrupted skin sutures. No plugging or deep sutures were employed.

The colt made an uninterrupted recovery, and the surprising thing is that the rupture of the near side has never reappeared; whether or not this was due to the loose testicle remaining at the entrance to the inguinal canal long enough to allow it to close, I cannot say.

The interesting part of the operation, to my mind, is that through a mistake I operated on the side that had already been operated on, and by so doing avoided the necessity of irritating an inguinal canal that was already pathological, as this would possibly have increased the rupture and might even, at a later date, have caused the death of the patient from strangulation of the bowel.

Discussion.

Mr. W. Wallace Peggie said that it occurred to him that if Mr. Robertson should find himself in the same predicament in future he should make a rectal examination, when in all probability he would be able to ascertain on which side the retained testis lay. He himself made it a routine practice to examine rectally in any case where there was doubt about the side which had been operated on at a previous date, and where no scar was visible. He thought Mr. Robertson was a brave man to have done both operations at the one time. He did not think it was unusual for the hernia to have remained reduced since the fibrous swelling and consequent cicatrisation would act almost as well as sutures in retaining the hernia.

Professor W. M. Mitchell asked of what the hernia consisted; Mr. Robertson did not say what he had reduced. Was it by any chance a varicocele of the cord? He remembered being asked to operate on a horse said to be ruptured and a rig on the same side. The large scrotal swelling simulating a hernia turned out to be nothing more than an enlarged pampiniform plexus of veins, or varicocele, the testicle being very large and intra-abdominal. He wondered whether Mr. Robertson's case was similar.

He would also like to know what it was that Mr. Robertson had ligatured; was it a mass of veins, or was it the whole spermatic cord? Did the animal show any sexual precocity subsequently?

He also had had difficulty in deciding which testis had been removed in unilateral cryptorchids, but he would hesitate to introduce his hand into the rectum immediately before operating. In most cases, if the hind limbs were well flexed it was possible to palpate the cut end of the cord in the groin.

Mr. W. Wallace Peggie said he had not meant to advocate rectal examination immediately before operation. His practice was to visit the case three days before operation and make the rectal examination then.

Mr. Robertson, in reply, said he had fully expected that he would be able to determine the side which had been operated on, before operation, but after casting and cleansing, and had not anticipated any difficulty. Had he done so he would have made a rectal examination previously.

No sexual excitement whatever was shown by the horse after operation; it recovered and did well and behaved quite normally. Included within his ligature of the stalk were blood vessels and a deferent duct: it was, to all intents and purposes, a spermatic cord.

At a sessional meeting of the Royal Sanitary Institute to be held in the Town Hall, Batley, a discussion on "The Practical Value of Meat Inspection" will be opened by Major D. S. Rabagliati, O.B.E., B.SC., F.R.C.V.S., D.V.S.M. (Chief Veterinary Officer, West Riding County Council), on Saturday, May 2nd, at 10 a.m.

At a meeting of the Council of the Clydesdale Horse Society, held in Glasgow recently, Mr. Samuel Mackenzie was unanimously appointed secretary of the Society in succession to the late Mr. Archibald MacNeilage.

Carcinoma of the Lung in the Dog.*

By Professor Geo. F. Boddie, B.Sc (Edin.), M.R.C.V.S., Royal (Dick) Veterinary College.

Subject.—Retriever, eight or nine years old.

History.—In August, 1930, the dog was treated by a practitioner in his own kennels for pneumonia; after the animal returned home he had a soft cough, noticeable especially on any exertion, and was lacking in vigour.

I first saw the dog on September 12th, when the owner brought him in at the request of the practitioner who had treated him for pneumonia.

There was evidence of some degree of cardiac insufficiency, the pulse being fast and poorly filled. The cough was not heard, but the owner described it as being short and husky. Percussion and auscultation of the chest gave only negative evidence.

The dog was put on to digitalis three times daily.

On the 29th the owner brought the dog back and said he was greatly improved; the cough was less evident and his vitality greater. The pulse was stronger. In other words, the heart had responded to the stimulus of the digitalis. A supply of digitalis and strophanthus was given to the owner with instructions to give them week about. The owner called in a month to say the dog was "fairly well."

Signs and Symptoms.—I next saw the dog on November 29th, 1930, by which time he had lost a good deal of condition, was listless, and the slightest exertion provoked a distressing cough. The mucous membranes were somewhat anæmic; the pulse was regular, but rather small for the size of the animal.

Percussion suggested dulness on the left side and normal respiratory sounds were absent; there were no adventitious sounds.

A sample of urine was examined for albumen, bile, sugar, and blood, with negative results.

Appetite voracious.

The possibility of tuberculosis suggested itself and I applied the Von Pirquet Test with negative results.

[*Technique of Von Pirquet Tuberculin Test.*—Clip, shave, disinfect two areas, scarify both, apply concentrated tuberculin to one. Pustular formation positive reaction.]

On December 4th, the chest was X-rayed. Screening showed the left side definitely opaque and the heart displaced to the right.

Percussion now gave definite dulness on the left side.

Auscultation showed an entire absence of normal respiratory sounds on the greater part of the left side and no adventitious sounds.

On December 5th an exploratory puncture was made into the left side of the chest at the seventh intercostal space. No fluid was found in the chest, but a small amount of material was removed with the needle; smears were made from this and stained for tuberculosis bacilli and other organisms, with negative results, leucocytes and a few lymphocytes and fibrin being all that was visible.

Conclusion.—I now came to the conclusion that the case

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* Case presented to the Annual Meeting of the Scottish Metropolitan Divison, N.V.M.A., at Edinburgh, on January 28th, 1931.

was one of consolidation of the left lung, and very probably was some type of tumour formation.

Course.—The owner was at first loth to have the dog destroyed, and on December 8th, 9th and 10th, the left side of the chest was exposed to ultra-violet rays for periods of five, ten and fifteen minutes respectively.

On December 13th, the breathing became very distressed, the pulse fast and thin, and the mucous membranes injected.

On December 14th the dog was destroyed and a *post-mortem* made.

Post-mortem.—Gross lesions were found in the lungs. The left posterior lobe was enormously enlarged and the centre—as you will see from the specimen (exhibited) had broken down and contained some ounces of purulent fluid.

The greater part of the left lung was involved in gross changes; multiple nodular masses were present in the right lung.

The left lung in one place was firmly adherent to the chest wall. The neighbouring lymphatic glands were enlarged. No macroscopic lesions were seen in any of the other parts of the body.

The heart was flabby and displaced to the right.

I handed over the entire thoracic contents to the Pathology Department, and I am indebted to my colleague Professor Matheson for his diagnosis, which is one of carcinoma, the spread throughout the lung tissue being by lymphatic permeation.

Discussion.—While, clinically, primary carcinoma of the lung is not uncommon, from a pathological standpoint the condition is rare, though clinically the primary lesion may give rise to no determinable symptoms.

In this case the condition appears probably to have been primary.

Discussion.

Dr. J. R. Greig thanked Professor Boddie for his able paper, and said he would like to ask whether the histological findings enabled the length of time which the carcinoma had been in existence to be estimated.

Professor W. M. Mitchell asked what variety of carcinoma had been found.

Professor Boddie, replying, said the only evidence was that since August the clinical symptoms had been in existence; there was no further information available. The carcinoma had been shown to be of the squamous cell type.

Musk-rat Breeding.

The Ministry of Agriculture and Fisheries is anxious to obtain as full information as possible on the extent to which the Musk-rat (or Musquash) farming industry is established in England and Wales. It would be much obliged if any persons now keeping and breeding musk-rats in England and Wales—whether for stock or pelts—would communicate at once with the Secretary, Ministry of Agriculture and Fisheries, 10, Whitehall Place, London, S.W.1, stating the number of musk-rats kept. Envelopes so addressed need not be stamped.

The Butchers' Cattle Insurance Society's annual report states that the year had been disappointing, for it was hoped to have experienced a diminution of the losses of cattle since the Tuberculosis Order was imposed; but instead, it was found that the disease showed little sign of abatement or elimination in fat cattle.

Arable land in England and Wales has decreased by 1,337,692 acres since 1920, and by 849,104 acres since 1925.

N.V.M.A. Branch Report.

Scottish Branch.*

Annual General Meeting at Stirling.

The Annual Meeting of the Scottish Branch was held in the "Golden Lion" Hotel, Stirling, on Saturday, November 8th, 1930. Mr. W. Nairn, the President, occupied the Chair and there were present the following gentlemen:—

Major J. G. McGregor, Messrs. D. Campbell, Geo. Sangster, R. M. Smith, J. Macfarlane, Jas. M. McDougall, Jas. F. Taylor, H. F. Downie, Professor Geo. F. Boddie, Messrs. L. Jordan, Professor Wm. M. Mitchell, Messrs. K. A. Forker, H. M. Wilson, Principal O. Charnock Bradley, Messrs. F. A. Davidson, R. G. Anderson, W. Scott, Wm. Anderson, A. Gofton, A. Spreull (Sen.), A. Linton Robertson, A. Spruell, Wm. Nairn and the Hon. Secretary.

The minutes of the last meeting, having been printed in the *Veterinary Record*, were taken as read, and were approved.

Apologies for absence were intimated from Major A. Douglas, who was unfortunately prevented from being present owing to illness, from Major A. Baird, Messrs. J. Brown and J. Anderson.

Correspondence.

(1) From the Secretary, National Veterinary Medical Association, relating to the Scheme for the Eradication of Bovine Tuberculosis and indicating that the Veterinary Officers and Public Health Committee, which had examined the Scottish Branch Scheme, recommended that a scheme should be formulated for England and Wales.

(2) From the Secretary of the Dumfries and Galloway Division, intimating that the members of that Division had decided to make no contribution to the Branch Representation Fund, since one of their members had been elected to the Council of the Royal College of Veterinary Surgeons. The President mentioned that, in this connection, the Executive Committee had recommended that the previous decision to invite Divisional Secretaries to collect subscriptions from their members and forward them to the special Branch Treasurer, should be rescinded and that the mode of collection at present in operation should continue in the future. Mr. A. Gofton moved approval of this recommendation, Mr. Campbell seconded, and it was carried unanimously.

(3) From the Secretary of the Dumfries and Galloway Division, giving a resolution to ask the Branch to take steps to assure that a veterinary surgeon be appointed to the staff of the Scottish Board of Health. [Excerpt read.]

The Executive Committee had recommended that this matter be referred back for further consideration. Mr. Campbell moved and Mr. Davidson seconded that this be approved, and the members unanimously agreed.

(4) From the Secretaries of the World's Dairy Congress, inviting the Branch to send a representative to the meetings of the Congress at Copenhagen in July, 1931. The Executive Committee had agreed to request Major McGregor to represent the Branch. On the motion of Mr. A. Gofton,

* Received for publication March 10th, 1931.

seconded by Mr. Davidson, this was confirmed, on the understanding that the Branch be liable for no expenses.

Election of Office-Bearers for 1931.

(*a*) *President.*—Mr. Nairn, the retiring President, said it was his privilege to nominate his successor in office. As they knew, the President of the Branch was selected from each division in turn and it was this time the turn of the West of Scotland Division. He had pleasure in nominating, therefore, Mr. Geo. Weir, the President of the West of Scotland Division. This nomination meeting with approval, Mr. Weir was elected President for 1931.

(*b*) *Secretary.*—On the motion of the President, seconded by Mr. Gofton, Mr. Miller was re-elected Secretary.

(*c*) *Executive Committee.*—The President reminded the members that the Executive Committee was elected to serve until the end of 1931, and therefore no new elections would be necessary at that meeting.

To the motion of Mr. Campbell, who proposed that, in the interests of continuity and co-ordination of policy, the retiring President should be co-opted on to the Executive Committee as a matter of routine, the meeting unanimously agreed, and Mr. Nairn was elected to the Committee.

President's Address.

The President, Mr. W. Nairn, then delivered his valedictory address. He said: "We now come to the stage in our programme when I take farewell of the Chair. I should like to thank the members of the Scottish Branch for their kindness to me during my two years' tenure of office.

The work has been both interesting and stimulating, but I fear the balance of profit has been on my side.

As this is the first meeting of the Branch since the election of the Council of the R.C.V.S., I take this opportunity of expressing to the members of the Scottish Branch the thanks of my colleague and self whom you helped to elect to the Council. Whether you have added to the wisdom of the Council I cannot say, but you have certainly added to the number of practitioners on the Council, and they are not too numerous yet. An outsider can have no conception of the great amount of work the Council deals with in the interests of our profession, but I can assure you they give very full and fair consideration to it all, and if they err in any of their decisions it is because they have been supplied with insufficient evidence to guide them in arriving at their conclusions.

Your representatives, if they attend the meetings of the N.V.M.A. in addition to the Council, have to spend a full week in London.

As you are aware, the Council of the R.C.V.S. have decided to extend the curriculum to five years; they have also decided that the student must produce evidence, when he comes up for his final examination, that he has seen a minimum amount of practice.

These changes will ensure that the graduates of the future are to receive a more thorough training than we received.

Educationally, this will be a great advantage to the profession, but only time will show how it will affect the numbers of students. Let us hope that by the time these better-equipped graduates enter the profession, agriculture will be enjoying greater prosperity than at present.

Our own Scottish Branch has been occupied lately with the re-drafting of the scheme advanced by the West of Scotland Division for the Eradication of Bovine Tuberculosis. Some improved procedure is necessary to deal with this menace to public health, and, so far, I cannot see the same promise of success in any other method of eradication.

To me it appears that, while it has some disadvantages, they are fewer than in any other method, and I hope the Ministry of Agriculture will agree to support an experimental local scheme in Scotland, and that it will produce results which will finally eradicate the doubters. There is still considerable work to be done before our experimental scheme is completed; this work has added much to the labours of Major A. Douglas, of Ayr, who throughout the whole development, has taken a leading part in the advancement of the scheme, and has well earned the thanks of the profession for his services.

Perhaps before I sit down I might draw your attention to what seems a development of the times, *viz.*, the increasing tendency for others than those with a veterinary training to take up the investigation of animal diseases. It behoves us to be watchful of our rights, but we must also, as I feel sure we do, show that we are willing to co-operate in any properly organised effort to unravel the troubles of the stockowner.

I would ask you to consider this question of the better representation of the practitioners of our profession on any body organised to study animal diseases and which draws State funds for that purpose. As things are at present, there is frequently a waste of public money.

While these remarks are not made with any reference to the Animal Diseases Research Association of Scotland, yet I think that that body would gain by giving the veterinary profession more representation on its directorate, since at present it seems to be over-weighted with purely agricultural opinion.

These points which I have raised seem to be questions for the consideration of our recently-formed Executive Committee. I need not weary you further, but would assure you that, while I may be vacating the chair, I do not terminate any interest in the well-being of our profession. (Applause.)

Mr. Gofton moved that the members of the Scottish Branch place upon record in the minutes, their keen appreciation of the services rendered by Mr. Nairn, the retiring President. He thought all would agree that the Branch was exceedingly active and alive to the interests of the profession in Scotland, and that was due in no small measure to Mr. Nairn's influence. He also moved that they record their satisfaction on the election of Mr. Nairn and Mr. Spreull to the Council of the Royal College of Veterinary Surgeons, and offer these gentlemen their congratulations. He mentioned that, at the Royal College of Veterinary Surgeons' meetings, they would find very much of intense interest and importance to the profession, and they would realise, as only those who were on the Council could realise, what an immense amount of work was carried out at the meetings in London.

These motions were carried unanimously and with applause.

Mr. Nairn observed he would only say that he desired to thank them all very much for their support, and

Mr. Gofton for what he had said. On behalf of Mr. Spreull and himself, he would like to say that it was helpful to feel that they had the support and confidence of the members behind them, and they would do their best.

Paper.—Mr. J. N. Ritchie, Chief Veterinary Officer for Midlothian, was then introduced by the President. He read an address entitled "Some Notes on the Clinical Examination of the Cow's Udder," which receives publication elsewhere in this issue.

Branch Representation Fund.— Major McGregor was called upon by the President to report briefly upon the Branch Representation Fund, of which he had been elected Treasurer at the last meeting. From the Fund the Executive Committee had decided that an *interim* grant be made to the delegates, to aid in defraying travelling expenses to and from London. He thought the initiation of the Fund had been successful and hoped that those members who had already supported it would continue to do so, and those who had not would commence to do so.

He said he would like to make reference to the admirable services Mr. A. Gofton had rendered to the members in Scotland and to the profession as a whole, by his attendance and activity at the Royal College of Veterinary Surgeons Council meetings in London over a long period of years. He thought that they were rather apt to forget the services of those members of Council who had been attending the London meetings—often at considerable discomfort and inconvenience to themselves—but he would like to assure Mr. Gofton that they did really appreciate his work, on their behalf, in the past. He would suggest that due record be made in the minutes to that effect. (Applause.)

The President then intimated that owing to the indisposition of Major A. Douglas, whose name was down on the Agenda to present a report of the activities of the Tuberculosis Sub-Committee, he would call upon Major McGregor to give them an outline of the progress made with the Eradication Scheme.

Report of the Tuberculosis Eradication Scheme Committee.

By Major J. G. McGregor, M.R.C.V.S., Stirling.

On behalf of the Committee, I have to make the following *interim* report.

At the close of the meeting held in this room on May 3rd, the Committee met and discussed the steps to be taken for furthering the Scheme, and the report which is now submitted is a record of our work.

On May 7th the Sub-Committee had a meeting with the National Farmers' Union for Scotland at the office of their Secretary in Glasgow. The Scheme, as prepared by the Scottish Branch, was considered in detail and certain amendments were suggested by the Farmers' Union. These amendments were matters of minor importance and, as they did not affect the main principles of the Scheme, your committee agreed to accept them. As a result of this meeting the Scheme is now receiving the full support of the National Farmers' Union of Scotland.

On the invitation of the Scottish Chamber of Agriculture I attended their Summer Conference and explained the Scheme to their members. The Chamber of Agriculture approved of the principles of the Scheme and also agreed to give it their full support.

A copy of the Scheme was sent to the Department of Health for Scotland, the various local authorities in Scotland, and Scottish Members of Parliament. Favourable replies have been received from many of these.

Regarding the Highland Agricultural Society of Scotland, the Directors remitted the Scheme to their Science Committee, and a report made by that committee to the directors showed that the committee failed to grasp the principles underlying the Scheme. It is noteworthy that no M.R.C.V.S. is on this committee, and it is unfortunate that when considering the Scheme the committee did not have the assistance of a veterinarian. The report of the Science Committee to their parent body was referred to at the Annual Meeting held in the Dumfries Showground in July, and so strong were the representations made to the Society by the members of the Ayrshire Cattle Herd Book Society and others, to reconsider the subject, that the Directors of the Highland Society, at their meeting on November 5th have re-opened the matter and are inviting a deputation from the Ayrshire Cattle Herd Book Society and this Association to meet the Science Committee and discuss the whole question.

Having obtained the co-operation and assistance of the National Farmers' Union for Scotland, the Scottish Chamber of Agriculture, and the Ayrshire Cattle Herd Book Society, a request was made to the Minister of Agriculture that he should receive a deputation representing these three bodies and this Association regarding the Scheme. This request was complied with and Dr. Addison, the Minister of Agriculture and Fisheries, received a deputation at his office in Whitehall, on Wednesday, August 6th. The deputation consisted of Mr. Picken, representing the Farmers' Union; Mr. Henderson, representing the Scottish Chamber of Agriculture; Colonel Houldsworth, representing the Ayrshire Cattle Herd Book Society; the President and Secretary of the Scottish Branch; and the Chairman and Secretary of the Committee dealing with the Scheme. The Minister of Agriculture was accompanied by his Chief Veterinary Officer, and a *verbatim* report of the interview was taken by Treasury Reporters. At the direction of the Minister of Agriculture a copy of this report has been supplied to each member of the Deputation. The Minister has given his approval for copies of the proceedings of the interview to be made available to members of the Scottish Branch and, as would be noticed from the columns of last week's *Veterinary Record*, members of the Branch can obtain a copy by sending twopence in stamps to Major Douglas, 17, Wellington Square, Ayr. For those who have not read the proceedings I might state that the Minister of Agriculture gave the Scheme a very favourable reception and asked the Deputation to select a suitable area and show how the Scheme would operate, and the cost that would be involved in applying the Scheme to that area. The Minister stated that before he could approach Parliament for a grant he must have more definite figures to go on, and he suggested that a suitable area be selected and figures drawn up showing what the Scheme would cost if applied to that area. The selection and preparation of an area was left in the hands of your representatives and the committee has fixed on that part of Ayrshire comprising the contiguous parishes of Coylton, Dalrymple, Ochiltree, and Stair. This area is almost entirely dairying. It contains 180 herds and, while a large percentage of the herds is self-supporting, there are only three which are licensed

under the Milk (Special Designations) Order. Thirty of the herds contain pedigreed stock. On the other hand, 40 per cent. of the herds have, since the introduction of the Tuberculosis Order, provided one or more animals to be dealt with under that Order. The area has natural boundaries on the North and South in the rivers Ayr, Lugar, and Doon; while to the East and South-East the area is bounded by sheep land. Immediately the area was selected the committee invited the Ayrshire Division of the N.V.M.A. to consider the matter, and the members who practise in these parishes have assured us of their hearty co-operation. A very thorough canvass of the farms in the area is being made by the County Veterinary Officer of Ayr, and his Assistants, and all the details which it is necessary to consider, and on which the costs of the Scheme are based, are being gathered by them. On the return of Major Douglas from the South it is proposed to hold meetings of the branches of the National Farmers' Union in these parishes, when the Scheme will be explained to individual farmers and their co-operation invited. In this connection there will be certain expenses incurred, circulars calling the meeting, hire of hall, etc., and these must be met. It is realised that the Branch has no funds of its own, but the Committee feels that the charge is a legitimate one on the funds of the Association, and should be borne, if not altogether, at least in part, by it.

The President moved a hearty vote of thanks to Major McGregor, which was carried unanimously. He said he would also like them to show their appreciation of the great endeavours made by Major A. Douglas in connection with the scheme, and to the members of the Tuberculosis Committee. He moved that their appreciation of the work of Major Douglas and the Tuberculosis Committee be recorded in the Minutes. Mr. Spreull seconded, and this was unanimously carried.

Mr. Gofton asked whether they could be informed of the nature of the proposed area. Was it the same as the Hannah Research Institute area?

Major McGregor said it was not the same area, but it was almost contiguous. Should both areas eventually be rendered free from the disease it would be a comparatively easy matter to clear the intervening area, and thus initiate general eradication of the disease from Scotland with a comparatively large reservoir of cattle freed from tuberculosis at the very beginning.

R.C.V.S. Council Election.—Mr. D. Campbell raised the question of the representation of the Branch at the next Royal College of Veterinary Surgeons' elections. He would remind them that Dr. Bradley and Dr. Whitehouse were due to retire, and he hoped both would be nominated again at the next election in 1931. He would like also to remind them that, although there had been no contributions to their Branch Representation Fund from North Ireland, the North Irish members agreed to support the Scottish representatives with their votes. He did not know whether any candidate would be nominated from North Ireland, but if so the Scottish members were pledged to support the Irish candidate with their votes. He would propose that the Branch members should agree to support the two Scottish candidates and any one North Irish candidate at the next elections.

Mr. A. Gofton supported this proposal and said that it was advisable to remember that the foreign voting papers were sent out in February and any candidate's nomination should be made early. This was agreed to by the members.

The Secretary called attention to the difficulty which Branch members who lived in the north had in getting to meetings which were held in the centre or the south of Scotland. He thought that it was desirable to arrange to hold at least one meeting in Aberdeen or in some other conveniently situated northern town, each year.

A considerable amount of discussion took place, in which it was obvious that it was the desire of a large majority of the members to meet the Northern members so far as possible.

Mr. A. Gofton moved that the principle of a central Scottish meeting place be retained, but that the next Branch meeting be held in the north. This was carried unanimously.

It had been decided by the Executive Committee that the details of arrangements for the next meeting should be left in the hands of the President and Secretary.

Mr. Gofton moved a formal hearty vote of thanks to the retiring President for his capable conduct in the chair during the meeting. This was carried with acclamation.

Mr. Nairn briefly replied and thanked the members.

This concluded the business.

W. C. Miller, *Hon. Secretary.*

N.V.M.A. Divisional Reports.

Scottish Metropolitan Division.

Annual Meeting at Edinburgh.

The Annual Meeting of the above Division was held in the premises of the Royal (Dick) Veterinary College, Edinburgh, on January 28th, 1931, commencing at 11 a.m. The meeting had been arranged to take the form of a series of short addresses and demonstrations on subjects of interest to the general practitioner, and detailed reports of which appear earlier in this issue.

Mr. J. E. Wilson, Poultry Pathologist at the Royal (Dick) Veterinary College, spoke on Avian tuberculosis, and gave demonstrations in the operating theatre of the method of using the tuberculin test for the diagnosis of tuberculosis. Fowls which had been injected the day previous were exhibited; some showed a typical positive reaction and others a negative reaction. A number of pathological specimens were also shown and discussed.

In the clinical laboratory several papers were read and discussed and demonstrations given.

Major Grahame Williamson described the clinical history and Professor W. M. Mitchell the *post-mortem* findings in a case of osteo-arthritis in the horse. Both wet and dry specimens of this case were shown to the members.

Major Grahame Williamson also showed the X-ray film of the foot of a horse suffering from fracture of the third phalanx, and gave a brief description of the case.

Professor G. F. Boddie described the clinical history and showed the *post-mortem* findings in a case of carcinoma of the lung in the dog.

Mr. C. B. Davidson read a communication on anæsthesia in the horse as used in the Clinical Department of the College.

Subsequently, in the Clinical Yard, two light (saddle) horses were shown to the members. These had each been

subjected to the operation of Crib-biting some time previously. Major Grahame Williamson and Major Robertson briefly described the cases.

Luncheon.—An informal luncheon was held in the O.T.C. Common Room of the College, Mr. W. Nairn—the retiring President—occupying the chair. The Common Room was very kindly lent by Captain J. N. Ritchie, the Commanding Officer of the O.T.C. After the single toast of the King, Professor R. G. Linton proposed a hearty vote of thanks to Captain Ritchie for putting at the disposal of the Division such an admirable room. This was carried with acclamation.

Before the meeting was again constituted for the annual business, a series of pathological specimens was on view in the Anatomy Research Laboratory.

The Business Meeting.

At 2 p.m. Mr. Nairn, the President, took the chair, and there were present :—

Members.—Dr. O. Charnock Bradley, Messrs. P. Wilson, Edward J. Duncan, J. N. Ritchie, G. D. Munro, William Anderson, J. P. Walker, A. R. C. Bowie, Majors J. Gilray McGregor, Grahame Williamson and — Robertson, Professors R. G. Linton, W. M. Mitchell, and George F. Boddie, Dr. J. Russell Greig, Messrs. C. B. Davidson, A. Linton Robertson, J. Player, Major R. G. Anderson, Messrs. D. R. Wilson, A. Brownlee, W. Wallace Peggie, J. Ker, Esmond Brown, H. M. Wilson, Dr. T. W. M. Cameron, and the Hon. Secretary.

Among the *visitors* were Miss Bissett, Messrs. J. B. McLauchlan, John Reid, J. E. Wilson, A. S. Gordon, and a large number of members of the Diploma in Veterinary State Medicine and Final Year classes.

The Secretary intimated that the minutes of the last meeting were in the press, and he proposed the consideration of them be deferred until after they appeared in the *Veterinary Record*. To this proposal the members agreed.

Apologies for absence were intimated from Major A. Baird, Messrs. A. Gofton, A. Spreull, T. M. Inglis, J. Taylor and J. Brown.

Correspondence.—A letter was read from the Royal Sanitary Institute inviting the Division to send a delegate to the Annual Congress of the Sanitary Institute, which this year would be held in Glasgow. The Council, which met earlier in the day, had agreed to recommend that Major McGregor be appointed Divisional delegate. Major McGregor's name was unanimously adopted by the meeting as their representative at the Congress.

Secretary's Report.—The Secretary read a brief report of the last two years' working, and submitted the Balance Sheet, which showed the funds to be satisfactory. On the motion of Professor Mitchell, seconded by Dr. T. W. M. Cameron, the report was adopted.

Election of Office-Bearers.

The retiring President, Mr. W. Nairn, said that he did not intend to occupy much time in addressing them, since there were still several items on the Agenda to be considered. He was retiring from the chair after two years of office, during which he had had many instances of their loyal support and of their co-operation. Looking back on the meetings over which he had had the privilege of presiding, he could truthfully say he had enjoyed them all. It was a comparatively easy matter for the Chairman to keep them in order in most cases, for even in spite of some very lively discussions during the last two years, they had given him no trouble at all.

Mr. Nairn referred briefly to the new curriculum of the Royal College of Veterinary Surgeons, and to the position in the profession occupied by the local practitioner.

He then said that he would finally claim from them the privilege of nominating his successor in office. They all knew Professor Mitchell, of the Royal (Dick) Veterinary College, and he felt sure they would support him when he proposed that they should elect him as their next President. Professor Mitchell had presented to them several papers for discussion in past years, and had done a lot for the Division. In conclusion, he wished to thank the members for the honour they had done him in electing him President for a double term of years and for their co-operation and forbearance while in office. (Applause.)

Dr. O. Charnock Bradley seconded the nomination of Professor Mitchell as President, and said he would like, as a pleasure and as a privilege, to propose a vote of thanks to the retiring President, Mr. Nairn. He thought they would all agree that he had carried out his duties in a polished, suave and dignified manner, tempered upon many an occasion with a fund of that dry humour which was characteristic of the Scots race. He asked the members to signify their approval and appreciation of the way their President had carried on his double term of office. (Loud applause.)

Mr. Nairn briefly and suitably thanked Dr. Bradley and the members for their kindness in having voted him a satisfactory Chairman.

In accordance with custom, the induction of the new President was deferred until the next meeting.

The President announced that the Council had made recommendations for the election of office-bearers as follows :—

Vice-Presidents.—Mr. W. Nairn, the retiring President; Professor R. G. Linton and Mr. W. Wallace Peggie.

Members of Council.—Mr. A. Gofton, Major J. Gilray McGregor, Messrs. A. Spreull and H. M. Wilson.

Auditors.—Professors R. G. Linton and Mitchell.

Secretary-Treasurer.—Mr. William C. Miller.

Representatives to Council of the National Veterinary Medical Association.—Mr. W. Nairn, Principal O. Charnock Bradley, and Mr. A. Spreull.

The President proposed that these gentlemen be elected *en bloc*, and Dr. T. W. M. Cameron seconded. There being no further nominations, these gentlemen were elected unanimously.

Professor R. G. Linton said he had been asked to move a vote of thanks which he, as a member of the Division, felt was one of great importance. They all knew that very many Divisions of the National Veterinary Medical Association were compelled to hold their meetings in hotels, public halls, etc., and that few indeed had had such facilities placed at their disposal for holding meetings as the Scottish Metropolitan Division. These facilities were due to the continuous kindness of the Principal, Dr. O. Charnock Bradley, in granting them the use of the College premises. He was quite sure the members would agree with him that the Royal (Dick) Veterinary College buildings constituted an almost ideal venue for their meetings

and would support him in his proposal that they should accord their sense of appreciation and gratitude by passing a sincere vote of thanks to Dr. Bradley for his kindness. This was carried with acclamation.

New Members.—Professor Mitchell nominated the following gentlemen for membership:—Professor D. Imrie (Glasgow), Mr. J. B. Mackie (Dunfermline), and Mr. H. Bain (Berwick-on-Tweed).

Dr. J. Russell Greig nominated Mr. W. Smith Gordon, of the Moredun Institute, and Captain J. N. Ritchie nominated Mr. John Reid, Assistant County Veterinary Officer.

Professor R. G. Linton said he would like to be the first to nominate the first lady member to the Scottish Metropolitan Division, and with her consent he would like to nominate Miss Bissett, who was with them that day, as a member. He also wished to nominate Mr. J. E. Wilson, his colleague on the College Staff.

Miss Bissett briefly thanked Professor Linton for her nomination, but said she must decline the honour in the meantime, since she was only in Edinburgh on a short visit and expected to be resident in Ireland, from where it would be difficult for her to attend their meetings.

Papers.—There followed a series of papers given in the Anatomy Lecture Theatre, as follow:—"Decubitus after Milk Fever," by P. Wilson; "An Experience while Castrating a Cryptorchid," by A. Linton Robertson; "External Canthotomy in the Dog," and "A Simple Injection for Prolapse of the Rectum," by Professor Mitchell; while Professor R. G. Linton demonstrated samples of dried grass cake, to which reference had been made in the forenoon session.

[These papers, with their discussions are published elsewhere in this issue.—Ed.]

Mr. Wm. Anderson raised the question of the treatment of canker by the injection of spleen solutions. Some discussion ensued, during which it appeared that several members had used the method with no success.

The President said he would like to propose a very hearty vote of thanks to those members who had taken the trouble to prepare such a fine series of papers and demonstrations, and he would ask the members to support his proposal without more ado. This was carried with acclamation.

The Secretary announced that, at a recent meeting of the Scottish Branch, it had been decided that the collection of voluntary subscriptions towards defraying the expenses of the Scottish Representatives to the Royal College of Veterinary Surgeons should remain on the same footing as last year. It had been decided that, instead of each Divisional Secretary collecting the subscriptions, each member of the profession should send his subscription direct to the Branch Treasurer of the Fund, Major J. G. McGregor.

Major McGregor said that he was glad of the opportunity of adding to what had been said. He had prepared a circular which would be sent out shortly to each member, inviting him to subscribe. He wanted it to be understood that the subscription was a nominal one of 10s. only, and that it was voluntary. There would be no need to remind them of the purposes of the Branch Representation Fund, details of which were announced at the last Branch meeting, nor of the desirability of supporting their Scottish Representatives, not with their votes only.

Professor Mitchell observed he would like to take that opportunity of thanking the President and the members present for electing him to the President's Chair for the ensuing session. He hoped the Division would still be in at least as good a position when he gave up the chair as he found it now on entering it. He thought there was no reason why the Scottish Metropolitan Division should not continue to be one of the best in the country, if everyone who belonged to it would do his share. He hoped that during his term of office clinical matters would occupy the chief part, though not the whole, of their attention, and he hoped every meeting would be as satisfactory as that day's had been. He thanked the Division for having elected him President.

He would like to propose, and was sure they would accord, a hearty vote of thanks to Mr. Nairn for his admirable conduct of the chair during the whole of that day.

This was carried with acclamation. Mr. Nairn, in a word, thanked Professor Mitchell and the members.

This concluded the meeting.

Wm. C. Miller, *Hon. Secretary.*

Dumfries and Galloway Division.*

Officers Elected at Dumfries.

The Annual General Meeting of the above Division was held at the Station Hotel, Dumfries, on Tuesday, December 9th, 1930.

The following members were present:—Messrs. A. Young (President), R. Simpson, R. C. Robinson, P. McKinley, A. J. Milligan, A. Edgar, G. W. D. Davidson, O. Stinson, J. Waddell, J. Bell, N. McAlister, W. S. McKenzie, G. A. Sangster, A. J. Kennedy, and F. A. Davidson (Hon. Secretary). Dr. E. Armstrong and Mr. A. W. Stableforth were present as visitors.

The minutes were taken as read, as published in the *Veterinary Record.*

Motion to Alter Rule V.—Mr. A. Young proposed, Mr. A. A. Edgar seconded, and it was agreed that Rule V be altered to read:—

"That the Entrance Fee shall be £1 1s. each new member; Annual Subscription £1 1s. each member; Annual subscription shall be divided equally between the General Funds of the Society and a Fund to be kept for the purpose of assisting to defray the expenses of the Representatives of the Division on the Council of the Royal College of Veterinary Surgeons and/or the Council of the National Veterinary Medical Association."

Correspondence.

Representatives on the Council of the N.V.M.A.—(1) From the Secretary, N.V.M.A., which indicated that a representative was now allowed for every 35 members, or part thereof, of a Division. The members present expressed their willingness to make every effort to increase the membership of the Division.

* Received for publication March 3rd, 1931.

Scheme to Increase the Membership of the N.V.M.A.—(2) From the Secretary, N.V.M.A., suggesting that a Committee be formed by the Division to assist in persuading members of the Division, who had not already done so, to become members of the N.V.M.A. It was decided that, as the Division was a very scattered one and the majority of the members of the Division were already members of the N.V.M.A., no action be taken.

Mr. McAlister spoke in support of a letter which he had addressed to the Secretary with regard to certain matters which he considered affected adversely the general practitioners. On the motion of Mr. McAlister, seconded by Mr. Edgar, it was decided to form a Sub-committee of three practitioners, to consider the question fully before the next meeting of the Division. The following gentlemen were appointed members of the Sub-Committee, on the motion of Mr. Milligan, seconded by Mr. Simpson:—Messrs. McAlister, Young and Craig Robinson, with the Honorary Secretary as Secretary of the Committee.

Other Correspondence.—The Secretary read correspondence in connection with business discussed at the last meeting and which required no further action at this one.

Election of Office Bearers.

President.—Mr. Hewetson, Brampton, was unanimously elected on the motion of Mr. Young, seconded by Mr. Simpson.

Vice-President.—Mr. Young was elected on the motion of Mr. Edgar, supported by Mr. Robinson.

Hon. Secretary and Treasurer.—Mr. F. A. Davidson was re-elected.

Auditors.—Messrs. Lindsay and Sangster.

Executive Committee.—On the motion of the Secretary, supported by Mr. McAlister, it was agreed that the member to serve on the Executive Committee in addition to the office-bearers, who are members *ex-officio*, should be the Division's representative on the Council of the N.V.M.A.

Interesting Cases.—Mr. Young demonstrated two hearts showing interesting lesions.

Next Meeting.—It was decided to hold the next meeting at Carlisle towards the end of February, it being provisionally agreed to arrange for a demonstration of the intradermal tuberculin test.

Mr. Stableforth's Paper.—Lunch was taken at the Hotel and was followed by a discussion on Mr. Stableforth's interesting paper on "Mastitis," which had been previously circulated to the members. [Both paper and discussion appear earlier in this issue of the *Record*.—Ed.]

The President, in introducing Mr. Stableforth, said that all of them knew, from recent publications, the very interesting and important work which was being carried out on mastitis by Mr. Stableforth and his colleagues at the Research Institute of Animal Pathology, London.

Before asking Mr. Stableforth to introduce his paper, he would take that opportunity of welcoming to the meeting Dr. E. S. Armstrong, Bacteriologist for the County of Dumfries. Most of the practitioners present had received assistance from the County Veterinary Inspectors at various times, and they informed him that it was only due to the very willing co-operation and assistance of Dr. Armstrong that the bacteriological part of their work had been carried out, especially as regarded the disease which they had under discussion that day.

Mr. Stableforth introduced his paper in the following terms:—"As my essay on this particular subject has already been circulated, I feel that I ought to be quite brief; and will therefore merely draw your attention to certain points of major importance. But before doing that, I want to say how much I appreciate the honour you have done me and how delighted I am to be here to-day.

"I have not attempted to deal with the whole question of mastitis, because it would be impracticable to discuss so much in one afternoon, but have confined myself to the epizootiological aspect. It is one of chief importance and one on which we have collected a great deal of information in our work at the Research Institute at Camden Town. Some of our observations on other aspects have been reported in the *Journal of Comparative Pathology and Therapeutics*, and the President will presently pass on the reprints which I have handed him.

"The first point to be emphasised is the entire separateness of the quarters of the udder, as regards bacterial flora. Carefully-drawn samples from one quarter of an udder may show a thousand hæmolytic streptococci per c.c.; from another as many non-hæmolytic or green streptococci; the remaining two may show a few staphylococci only. Obviously, if one or two quarters of an udder are harbouring large numbers of a particular organism there is a bigger chance of the other quarters becoming affected with that organism; but in practice such spread is by no means always the case. We have examined many cows that, over a period of many months or years, have regularly given large numbers of a particular kind of streptococcus from one or two quarters and none from the others.

"That brings me to the second point of emphasis; the organisms present in a particular quarter are constant in kind and, also, often approximately so in numbers: *e.g.*, certain quarters may harbour streptococci for months or years, and, unless some untoward influences lower the beast's general resistance or give the organisms an unusual chance of multiplying, balance will be maintained between the pathogenic efforts of the bacteria and the defensive forces of the cow.

"In prevention and treatment we ought to realise these factors; the quarters of an udder are separate entities, and one, two or more quarters may be harbouring organisms that are able to cause disease, for a long period without clinical change. There are auxiliary and external factors which we must consider as well as the question of pure bacterial invasion, its origin and course."

At the conclusion of the discussion, the President said it gave him great pleasure to ask the members to give to Mr. Stableforth a very hearty vote of thanks for the very interesting and instructive paper and reply he had given to them that day. There had been a good and varied discussion and he was sure Mr. Stableforth would realise, from this, that all of them had learned something which would be of use to them in the future. He hoped that his future work would show even more striking results than that of the past, and if they in that district could be of assistance in supplying material etc., they would be very willing to do so.

Mr. Simpson supported the President in his remarks and the members accorded Mr. Stableforth a very hearty vote of thanks.

Francis A. Davidson, *Hon. Secretary.*

Eleventh International Veterinary Congress, London.

August, 1930.

(*Continued from page* 378)

Deficiency Diseases.

By Professor Dr. Joseph Makek and Professor Dr. Oskar Wellmann.

Kgl. Ung. Tierärztliche Hochschule, Budapest.

Deficiency diseases occur in domesticated animals, especially in winter when animals are stall-fed or in times of bad harvests. They result from lack of vitamins, substances present in foods in only small amounts, but which exert marked specific biological effects.

At present five groups of vitamins are recognised, but there exists some confusion in terminology, which should be avoided. The groups are:—(1) The anti-xerophthalmic or keratomalacia-preventing vitamin A. (2) Vitamin B, comprising an anti-neuritic factor and a pellagra-preventing factor. (3) The anti-scorbutic vitamin C. (4) The anti-rachitic vitamin D. (5) The anti-sterility or reproduction vitamin E.

Before concluding that the absence of vitamins in responsible for clinical symptoms, a thorough consideration of the other constituents of the diet and of the general condition of the animal should be made. A complete change in the diet frequently adjusts lack of vitamins.

In animals, diseases due to lack of vitamin A are rare, but diphtheria of birds is probably due to this cause. Possibly chronic marasmus is due to absence of A or B. Polyneuritis of poultry results from B-avitaminosis. Acute beri-beri-like diseases have also been observed in dogs and rabbits. Diets deficient in vitamin C lead to scurvy, which, in the absence of marked clinical symptoms, can be recognised *post-mortem* by the existence of a rarifying fibrous ostitis, and degeneration or even necrosis of the internal organs may be found. The question as to whether the so-called "scurvy" of pigs and such diseases as purpura, primary œdema and "licking disease" are due to lack of vitamin C may be settled by histological examination of bones and internal organs, and by blood examination. Rickets is caused more frequently by an insufficient supply of calcium and phosphoric acid than of vitamin D. Uncomplicated cases of rickets and osteomalacia may recover; their occurrence can be prevented by supplying sufficient calcium and phosphate and by the administration of vitamin D or by ultra-violet irradiation, when the vitamin will be generated in the body.

W. R. W.

North of Scotland Division.

Early in the year Dr. J. Russell Greig, of the Moredun Research Institute, suggested that a meeting might be held in the North of Scotland of veterinary surgeons who have had experience of grass disease in their practices. Acting on the suggestion, the Secretary of the North of Scotland Division of the N.V.M.A. invited veterinary surgeons in the north and from as far south as Fifeshire, to attend the meeting on March 14th in Marischal College, Aberdeen.

There was an excellent response to the invitation. Dr. Greig reviewed, in a most admirable manner, all the work that has been done on the disease, and the discussion which followed the paper was very keen and helpful. It was certainly brought out in the discussion, which was as informal as possible, that practitioners in the grass disease areas were desirous of doing all they possibly could to further and to help in any investigations undertaken by Dr. Greig and his collaborators at Moredun.

Dr. Greig expressed very great pleasure at the meeting, and the members of the profession present were certainly stimulated, by the paper and subsequent discussion, to do all in their power to assist in the solution of the grass disease problem, hopeful that success will soon crown the research workers' efforts.

Dr. Greig was most cordially thanked for his presence and for his interesting paper.

J. McAllan, *Hon. Secretary.*

Abstracts.

[**Stages in the Development of Strongyle Eggs in East Prussian Remounts in the Belgard Station.** Staff Veterinary Dr. Fehtkötter. *Zeitschrift für Veterinärkunde.* March, 1930.]

As the result of examinations of fæces of sheep in Thüringia, Dr. Nöller has evolved a formula for differentiating between the chief groups of parasitic worm eggs.

A division is made, in the case of nematode eggs, between those with more, and those with less, than 16 segments. The stage of segmentation is discernible only when the fæces are examined while fresh.

In ruminants the division between the two groups is sharply defined. Amongst those with less than 16 segments are:—*Nematodirus filicollis*, *Bunostomum trigonocephalum*, *Bunostomum radiatum*. With more than 16 segments are:—*Hæmonchus contortus*, *Trichostrongylus retortæformis*, *Ostertagia ostertagi*, varieties of *Cooperia* and *Œsophagostomum*, and *Chabertia ovina*.

Strongyle eggs of the horse belong to both classes. Much work is still necessary on this subject and literature is scanty.

I have had the opportunity of ascertaining in the horses in my station, the proportion of oval, thin-capsuled, segmented nematode eggs with less, to those with more, than 16 segments.

Material and Technique.—Fæces for examination were taken from the rectum to ensure freshness and mixed within half an hour with an equal quantity of freshly prepared 10 per cent. formaldehyde solution in large, wide-mouthed bottles. The method of adding salt solution and centrifuging was adopted, following the example of Hobmaier and Taube. Five large drops were examined on a cover glass.

The fæces of 142 horses, the majority of which hailed from East Prussia, were examined. The ages of the animals varied from 4½ to 8½ years, and all had arrived at Belgard at their fourth year.

Results.—As usual, nearly all the horses harboured

worms. Of the 142, 10 showed Ascaris, one showed Oxyuris, 120 showed Strongyle eggs with more than 16, 81 showed them with fewer than 16 segments, 78 showed both classes and nine showed no eggs. The older the horses, the fewer in proportion were found to be infested.

Eggs were certainly identified which belonged to one or other of the two groups, but the distinction between the two classes is not so definite as in ruminants.

In our present knowledge we cannot yet deduce the variety of Strongyle from the character of the egg.

H. H.

[**On the Treatment of Parasites of Poultry**. Schmid, F. *T.R.*, 1930. pp. 313-6.]

The paper deals with Amidostomiasis of geese, Ascariasis of chickens and pigeons, Prosthogonimiasis of hens and geese and Capillariasis of pigeons. The author quotes briefly the treatment of other workers, gives a reference list and presents his own views as follows:—

The stomach worm of geese (*Amidostomun nodulosum* Rud, 1803) causes a characteristic lesion which is diagnostic: the worms reach the deep face of the horny layer of the gizzard, causing its erosion and destruction, and they can be readily seen on microscopic examination of the part. The author treated 13 young geese and found that a single dose of 2 c.c. of carbon tetrachloride, given by a stomach tube in about 5 c.c. of fine flour meal, caused the death of the parasites in four-week-old animals. Ascariasis of chickens is caused by *Ascaridia (Heterakis) perspicillum* Rud, 1803, and that of pigeons by *Ascaridia columbæ* Gmelin, 1790. The parasites live in the small intestine and their presence can be diagnosed with certainty by fæcal examination. Another species, *Heterakis vesiculosa* Frölich, 1791, sometimes causes great loss in chickens. The author found, by experimental treatment on three infected pigeons, that three-four c.c. of carbon tetrachloride, given in a bland vehicle and spread over two-four doses given on alternate days, caused the death and evacuation of the parasites. Results were checked by repeated fæcal examination until no more worms or eggs were found.

Various species of Prosthogonimus are parasites in the oviduct of hens and geese, which become infected by eating dragon-flies containing cysts. The resultant disease is common in the lake country around Berlin. Symptoms include the laying of eggs with thin shells or no shells, followed by cessation of laying and deterioration in general health. The presence of the parasites causes the formation of calcareous bodies in the oviduct. . . . Diagnosis is difficult, as eggs do not appear with any regularity in the excreta: the clinical picture is of most value. Carbon tetrachloride was found to be without any certain action in this condition.

The parasite *Capillaria columbæ* Rud, 1890, lives in the small and large intestine of pigeons and may cause a fatal enteritis. Diagnosis is easy and depends on the discovery of bipolar-capped eggs in the fæces. Carbon tetrachloride was found to be of little or no value in this condition.

No harmful effects were observed following the use of this drug on various kinds of poultry. The author notes that, as his experiments were few and uncontrolled, his published results require to be supported by further evidence before being taken as entirely correct.

J. T. E.

[**The Administration of Viscous Fluids through the Stomach Tube**. Veterinary Major Dr. U. Bürger. *Zeitschrift für Veterinärkunde*. April, 1930.]

It is agreed that castor oil is difficult to administer by the stomach tube unless it is thinned down or emulsified. While at the Berlin Veterinary High School, I arranged that, instead of the usual conical nozzle, an "olive" with an opening to fit over the end of the stomach tube should be supplied for a 200 c.c. syringe. With this improvement one can quickly introduce large quantities of castor oil, linseed tea, suspension of carbo medicinalis, gruel, etc. It can also be employed for aspirating fluids from the stomach. While it is being used for aspirating, an assistant must pinch the tube tightly while the syringe is being applied to or removed from it, in order to prevent the ingress of air.

H. H.

In Parliament.

The following questions and answers have been recorded in the House of Commons recently:—

Argentina (Livestock Import Duties).

Captain Waterhouse (*by Private Notice*) asked the Minister of Agriculture if he can make any statement on the outcome of his inquiries with reference to the import duties on livestock entering Argentina.

The Minister of Agriculture (Dr. Addison): I understand that the Argentine Government has imposed a duty of 22 per cent. on livestock in general imported into Argentina and a duty of 5 per cent. on pedigree livestock imported for reproduction, but, in view of the substantial differentiation in favour of pedigree livestock, which is the only trade in which this country is interested, after careful inquiry I have come to the conclusion that any action on our part is not justified.

Captain Waterhouse: Has the right hon. Gentleman not had a considerable number of communications from pedigree breeding societies, and does he not think that even the 5 per cent. duty in the present condition of agriculture will have a definite effect on agriculture, and, in view of this, will he not reconsider his decision to take no steps?

Dr. Addison: I can assure the hon. Member that this subject is one on which we have made very careful inquiry both here and, through the Foreign Office, in the Argentine, and, in view of, the fact that 5 per cent. is not a high percentage on pedigree stock, which are really wanted for breeding purposes, we have come to the conclusion that we are not in a position to make any further representation on the subject.

Mr. Charles Williams: May I ask the right hon. Gentleman if the 5 per cent. duty applies to all pedigree livestock going into the Argentine, including pedigree livestock from the United States, and that there are no exemptions, that is to say, that British pedigree livestock is in no way worse under the 5 per cent. duty than the pedigree stock of any other country?

Dr. Addison: I may require notice of one or two of these questions, but, so far as I know, there is no differentiation. I will enquire.

. . . . . .

Patent Medicines (Committee's Report).

Dr. Hastings asked the Financial Secretary to the Treasury whether he will order the reprinting of the report of the Select Committee on Patent Medicines, 1914?

Police Court Sequel to a Dog's Death.

Unqualified Man Fined.

Cyril Frederick Archer, of 174, Seaview Road, Wallasey, was at the Wallasey Police Court on March 20th, fined £4 and ordered to pay £6 costs for causing unnecessary suffering to a certain bitch by unreasonably omitting to give it proper and necessary care and attention.

Mr. John Roberts, who appeared on behalf of the R.S.P.C.A., said the defendant was a son of a qualified veterinary surgeon. The defendant, however, was not a member.

The animal in question, a terrier, he said, was in whelp, and on February 16th Mr. Archer saw the dog, which belonged to Mr. Whitley, of Poulton Road, examined it, and told Mr. Whitley he would call the next day. He called the following morning, and the bitch was still in labour. After again examining the animal, Mr. Archer told the owner that she would be all right and to send the animal to his surgery in Seaview Road in a taxi if she became worse. The following morning Mr. Whitley was so concerned about the condition of the bitch that he sent it to Mr. Warwick Fowle, M.R.C.V.S., and it was then found that there was a dead puppy preventing the natural delivery, and that no steps had been taken to get this away. The bitch died as a result of the septic condition which developed.

Mr. Archer said he had no letters after his name, but he could do the work. Mr. Archer went to Poulton Road and examined the bitch and said she was going on all right, and he would be in again the following morning. The next day he called again and said the dog would be in labour for about 24 hours. He said he would call again.

John Herratt, M.R.C.V.S., partner with Mr. Warwick Fowle at Birkenhead, said he was at the surgery when the bitch owned by Mr. Whitley was brought to the premises, and he found from an examination that she was bordering on collapse. She was in a state of delayed labour, and he took immediate steps to effect a delivery. The puppy was dead and in an advanced state of decomposition. It must have been in that position for at least two days. The bitch was treated for several hours, but died that afternoon. Two more dead puppies were found at a *post-mortem* examination.

With ordinary care and diligence, added the witness, the defendant should have found out that the puppy was there when he examined the bitch.

The defendant told the magistrates that he was until recently, assistant to his father, a veterinary surgeon, who had now given up owing to ill-health. He had treated about 800 cases at the local Animals' Welfare Dispensary, which he attended twice a week free of charge.

An official of the Animals' Welfare Dispensary said that since July Mr. Archer had cured and relieved 800 cases, including some apparently hopeless cases.

Mr. Pethick-Lawrence: The cheap edition of the report of the Select Committee on Patent Medicines, 1914, has been out of print for some years, and there is no evidence before me that there is a substantial demand to justify a reprint. The full edition, containing the proceedings and minutes of evidence, is still available.

. . . . .

Sheep Diseases (Research).

Major Carver asked the Minister of Agriculture whether, in view of the desire of sheepbreeders for some active development of research on sheep diseases, he proposes to stimulate such research?

Dr. Addison: A considerable amount of research in sheep diseases is already in progress. A scheme has been prepared for the development of research in animal pathology generally, upon which I hope it may be possible to make a commencement in the near future, and this will include increased provision for the diseases of sheep.

Notes and News.

The Editor will be glad to receive items of professional interest for inclusion in these columns.

Diary of Events.

April 13th.—Meeting of the Editorial Committee, N.V.M.A., at 2 Verulam Buildings, Gray's Inn, W.C.1.

April 14th.—Meeting of the Derbyshire Division, N.V.M.A., at Derby.

April 17th.—Meeting of the Mid-West and South Wales Division, N.V.M.A., at Bath.

April 24th.—Meeting of the Royal Counties Division, N.V.M.A., at Aylesbury.

May 8th.—Last day for nominations to Council R.C.V.S.

May 21st.—R.C.V.S. Voting Papers and Annual Report issued.

May 28th.—Last day for return of Voting Papers R.C.V.S. Council.

June 4th.—**R.C.V.S. Annual General Meeting.** Victoria Veterinary Benevolent Fund, Annual Meeting.

June 15th-20th.—D.V.S.M. Examinations.

July 2nd.—**R.C.V.S. Annual Dinner.**

Aug. 22nd-28th.—N.V.M.A. Congress at Norwich.

President, N.V.M.A.

We extend our heartiest congratulations to Lieut.-Colonel P. J. Simpson, D.S.O., T.D., F.R.C.V.S., upon his unanimous election as President of the N.V.M.A., which took place at an Extraordinary General Meeting of the Association held at 10 Red Lion Square, W.C.1, on Tuesday last.

Colonel Simpson succeeds Professor James Macqueen, who was unfortunately compelled to reliquish the office through ill-health. It is an honour which Colonel Simpson has well and truly earned by reason of his sterling work as Chairman of important Standing Committees over a number of years, and we are confident that the Association could have no more able or enthusiastic leader.

Spahlinger Treatment Test.

The Royal Agricultural Society Council, at its meeting on April 1st, decided to arrange for a preliminary test of the Spahlinger vaccine treatment for the prevention of tuberculosis. Thirty calves six months old are to be used for the purpose, 20 of which will be vaccinated and the remainder used as controls, and their progress will be watched at Cambridge by Professor Wooldridge, Dr. Minett, and Professor Buxton. If Mr. Spahlinger approves of the full details of the experiments, the Royal Agricultural Society will provide the cost, which is expected to be £500, and the duration of the tests will be 18 months.

Easter Monday Van Horse Parade.

The London Van Horse Parade, always a popular Easter Monday event, took place on April 6th in Regent's Park. The first of these parades, promoted by the London Van Horse Parade Society, was held in 1864, and this was the twenty-third of a continuous annual series. It was well representative of the London delivery van. The entries numbered 634, including 471 single-horsed vans, 80 pair-horsed vans, and three led horses. The largest number, 93,

were sent by dairy firms, then came general carriers 80, bakers 59, greengrocers 56, provision firms 42, laundries 27. There were also 54 entries from railways and large London firms.

The Lord Mayor and Lady Mayoress presented the prizes, 516 first-class awards and 28 second-class awards, as the procession, two miles long, passed the stand at the gate of the Botanic Gardens, Inner Circle. The animals eligible for the Parade are horses, cobs, and ponies used exclusively for trade purposes, which must be shown in the actual van and harness in which they perform their daily work. The object of the Parade is to improve the general condition and treatment of such animals, and to encourage drivers to take a humane interest in their general comfort.

Lord Daresbury, chairman of the London Van Horse Parade Society, presided at the luncheon given at the Botanic Gardens.

The Lord Mayor said the more he went abroad the more he was gratified by the humane manner in which horses were treated at home, and proud of the fine trait of British character which it indicated. The parade showed that in spite of the great development of motor transport the horse still held his own, and for delivery work in local areas involving frequent stops he was unquestionably the more economical.

Lieutenant-Colonel Percy Laurie, Chief of the Metropolitan Mounted Police, said he was amused to read in a Sunday paper that the mounted police were to be mechanised. That was the first he had heard of it. (Laughter.) He was sure that mechanisation would never be able to fill the rôle of the mounted police. He was told by observers that the way six mounted policemen handled the enormous crowd at the recent declaration of the poll at Caxton Hall, without a single accident or complaint, was quite marvellous. It was nonsense to say that the day of the horse was over. (Hear, hear.) He appealed to motorists to give fair play to the horse. If we observed the Highway Code of the Ministry of Transport it would be found that there was room on the highway for all. (Hear, hear.)

Sir George Hastings, Vice-chairman of the Parade Society, speaking for the judges, said the great studs managed by horse-masters which the big business firms formerly possessed had disappeared. In their place was the small individual man, who was very sensitive to criticism, but the parades showed that he was getting better and better in intelligent care of the horse.

Major-General Sir John Moore said horse-breeding in this country was not failing. The breeding of heavy horses was being carefully guarded by the Board of Agriculture, and the breeding of light horses was being watched over by the War Office. There could be no complete mechanisation of the Army so long as cavalry and artillery were branches of it.

Correspondence.

Letters to the Editor should reach the Office not later than by the first post on Tuesday morning for insertion in following Saturday's issue.

All correspondence must bear the name and address of the contributor for publication

The Editor does not hold himself responsible for the opinions of his correspondents.

Post-Graduate Courses.

To the Editor of The Veterinary Record.

Sir,—One point that cropped up in the discussion on Mr. R. A. Willett's paper, presented at the last meeting of the Central Division of the N.V.M.A., was that of clients losing confidence in their veterinary surgeon. In order to reduce the occurrence of this and the consequent loss of prestige by the individual practitioner, which is reflected back on the whole profession, it is strongly indicated that a concerted effort be made for the establishment of short post-graduate courses lasting not longer than five or six days. Such courses should be intense and advanced and all elementary matter omitted. All general practitioners should be eager to come up-to-date, particularly in methods of diagnosis, on which so much of their general standing depends.

An absence of but a few days would not affect practices adversely, provided that a locum tenens was available, and the fees payable should be made large enough to cover the cost of material and instruction.

The existing veterinary colleges would probably be best suited for courses in appropriate subjects with members of their staffs as instructors, but country practice technique would have to be taught by recognised experts selected from among our present practitioners, if they could be prevailed upon to serve in this manner.

Demonstrations at annual and local meetings of the N.V.M.A. and its Divisions do a little in this matter, but probably only a small minority pick up enough to apply themselves in their own practices.

Short post-graduate courses on a wide variety of subjects are given at frequent dates all over Germany and are well attended. They are organised by an official veterinary body; some are given in conjunction with veterinary colleges and others apart from them. They consist of lectures and practical demonstrations and usually extend over two to seven days.

I know also a German specialist practitioner who started a short one- or two-day course of instruction in a few operations on cattle and horses and he had attracted 60 post-graduate pupils within, I believe, two or three years.

Subjects most suitable for post-graduate instruction are diagnostic and therapeutic technique, including surgery. A few items out of a possible vast number are—the method of a clinical examination for sterility in cows, including microscopic and chemical tests, etc.; the uses of urine and blood tests in canine practice; the use of the stomach tube in all animals . . . . and so on.

It would probably be advisable to let would-be pupils choose suitable subjects themselves—in addition to including certain methods of universal use.

Yours faithfully,

Woodham Grange, Addlestone. *March 31st*, 1931. J. T. Edwards.

Treatment of Canker of the Horse's Foot.

To the Editor of The Veterinary Record.

Sir,—A. W. N. P., in the *Veterinary Record* of February 21st, in discussing Mr. William Nairn's paper on "Canker of the Horse's Foot" asks "Why is it that different practitioners in different districts get different results with the same treatment"? Mr. Nairn, it will be remembered, described his own method of treatment with formalin paste.

Surely the secret lies in the fact that the *most important* element in treating canker is thoroughness in using the knife. I do not think it is an exaggeration to say that the surgery of the horse's foot is an *art* not given to all of us to master.

Having had the privilege of assisting Mr. Nairn for some years and knowing his great success in treating cases of canker, I feel sure that this success can be ascribed to the use of a most efficient dressing properly applied, *combined with* thorough surgical attention to the parts affected.

Hong Kong. *March 14th*, 1931. Yours faithfully, H. C. Watson.

The Editor acknowledges the receipt of the following:—

Communications from Dr. Henry Dryerre (Edinburgh), Mr. E. E. Elphick (Hastings, New Zealand), Mr. E. J. Heather (Oxford), Captain A. W. Noel Pillers (Liverpool), Mr. W. M. Scott (Bridgwater), Major R. F. Stirling (Nagpur), Captain J. F. D. Tutt (Winchester), and Colonel G. K. Walker (Abingdon).

Report of the 47th Annual Meeting of the Western Counties Division, N.V.M.A., from Captain S. J. Motton (Hon. Secretary).

Report of North Midland Division, N.V.M.A. Social, from Mr. W. Tweed, Hon. Secretary.

Report of the Annual Meeting of the National Veterinary Benevolent and Mutual Defence Society, from Mr. R. C. Locke, Hon. Secretary.